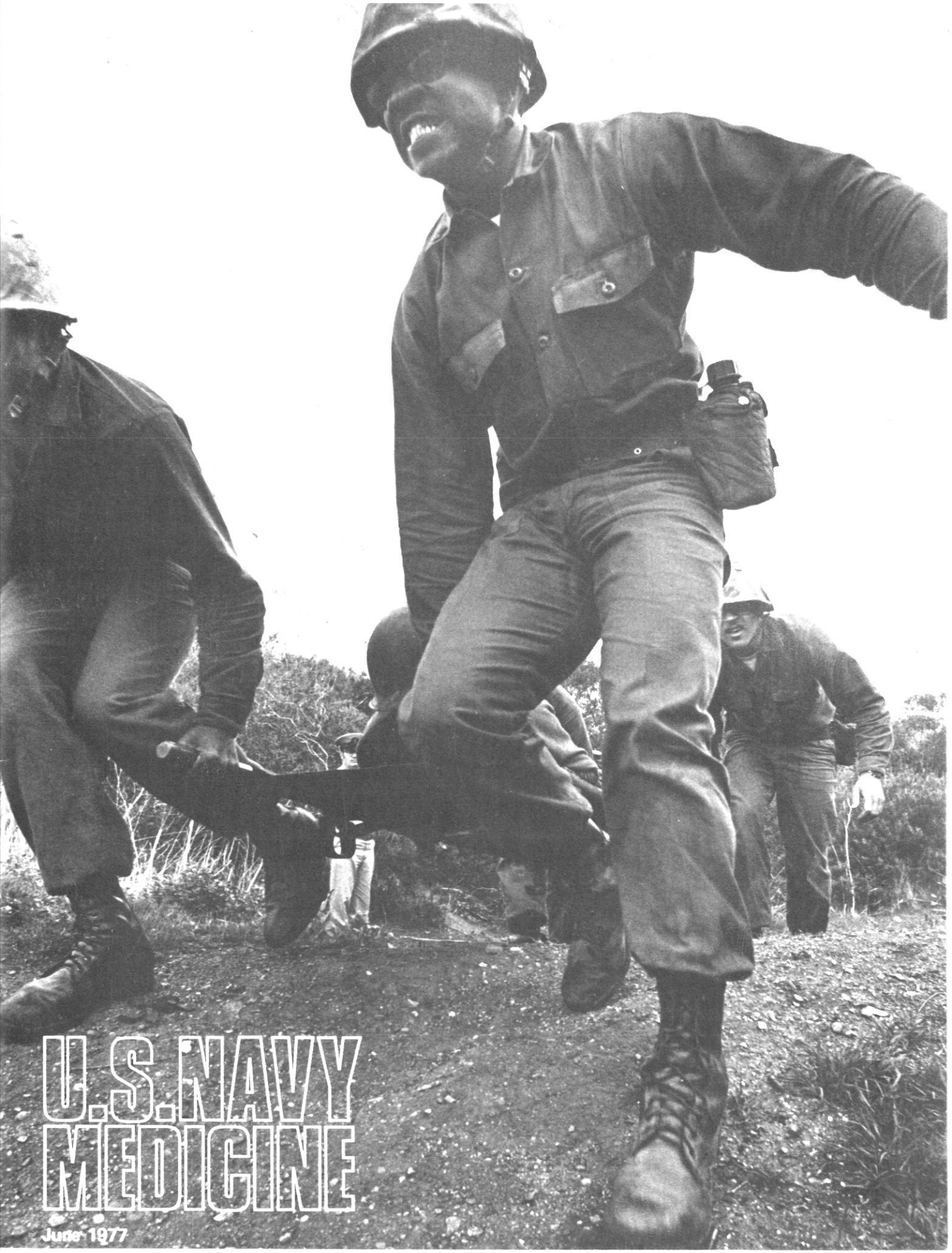

U.S. NAVY MEDICINE

June 1977

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NAVMED P-5088

U.S. NAVY MEDICINE

Volume 68, Number 6
June 1977

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COVER: For 79 years, our combat forces have been able to count on Navy hospital corpsmen for competent medical care under the worst field conditions. One reason: corpsmen are well trained for combat duty at field medical service schools. This month, *U.S. Navy Medicine* marks the Hospital Corps' 79th birthday with a feature on life at the Field Medical Service School in Camp Pendleton, Calif. (page 10).

SURVEY

What do you think of US NAVY MEDICINE?

We are constantly seeking to serve our readers and to improve the quality of US NAVY MEDICINE. That's why we'd like to know your ideas about this magazine—what you expect and need to know from the official journal of the Navy Medical Department.

If you will fill in and return this questionnaire, you can help us make US NAVY MEDICINE more responsive to your needs.

Feel free to tell us any suggestions you may have concerning US NAVY MEDICINE; if necessary, attach a separate sheet for your ideas.

After completing the survey, fold it so that our address faces out, staple, and mail.

1. You are now (circle one number)
   1 a member of the regular Navy
   2 a member of the Naval Reserve on active duty
   3 a member of the Naval Reserve not on active duty
   4 other military, or Public Health Service
   5 a civilian health care professional
   6 other _____
   (specify)

2. Your pay grade is
   1 0-7 to 0-9
   2 0-4 to 0-6
   3 0-1 to 0-3
   4 E-7 to E-9
   5 E-1 to E-6
   6 other _____
   (specify)

3. If a member of the Navy Medical Department, you are a
   1 Medical officer
   2 Dental officer
   3 Medical Service Corps officer
   4 Nurse Corps officer
   5 Hospital corpsman
   6 Dental technician

4. How often do you see US NAVY MEDICINE?
   1 Every month
   2 Every other month
   3 Seldom
   4 This is the first issue I have seen
   5 Other _____
   (specify)

How would you rate US NAVY MEDICINE's coverage of activities in the five Medical Department corps? (Circle the number under the appropriate column.)

	Good	Adequate	Poor	No Opinion
5. Medical Corps	1	2	3	4
6. Dental Corps	1	2	3	4
7. Medical Service Corps	1	2	3	4
8. Nurse Corps	1	2	3	4
9. Hospital Corps	1	2	3	4

Explain your answers to questions 5-9: _____

_____

_____

Would you like to see more coverage, the same amount of coverage, or less coverage of the following topics in US NAVY MEDICINE? (Circle the number under the appropriate column.)

	More	Same	Less
10. Medical Department policy	1	2	3
11. Personnel changes	1	2	3
12. Medical Department history	1	2	3
13. Facility construction	1	2	3
14. Career planning and opportunities	1	2	3
15. Education and training	1	2	3
16. New programs of health care delivery	1	2	3
17. Professional meetings and seminars	1	2	3
18. Technical medical and dental papers	1	2	3

How often do you read the following sections of US NAVY MEDICINE? (Circle the number under the appropriate column.)

	Always or often	Once in a while	Never read it	Never saw section
19. BUMED SITREP	1	2	3	4
20. Scholar's Scuttlebutt	1	2	3	4
21. Notes and Announcements	1	2	3	4
22. Policy; Instructions and Directives	1	2	3	4
23. NAVMED Newsmakers	1	2	3	4
24. Department Rounds	1	2	3	4
25. Clinical Notes	1	2	3	4
26. Professional papers	1	2	3	4
27. Enlisted Scene	1	2	3	4
28. On Duty	1	2	3	4
29. Independent Duty	1	2	3	4
30. Education and Training	1	2	3	4

The following articles and subjects appeared in US NAVY MEDICINE during the past year. How would you rate these stories? (Circle the number under the appropriate column.)

	Very worthwhile	Not bad	Worthless	Did not see story
31. "Collision at Sea" (medical care during Kennedy-Belknap collision)	1	2	3	4
32. "Hope for the Queasy" (Navy research on motion sickness)	1	2	3	4
33. "On the Run" (how Medical Department members keep in shape)	1	2	3	4
34. Women in the Medical Department	1	2	3	4
35. "Fleet Liaison: Covering the Waterfront"	1	2	3	4
36. Medical Department Equal Opportunity Program	1	2	3	4
37. Series of clinical notes on how to treat headaches	1	2	3	4
38. "Let's Stop Prescribing Cold Medications"	1	2	3	4
39. Medical support in Antarctica during Operation Deep Freeze	1	2	3	4
40. "Reducing Length of Patient Stay"	1	2	3	4
41. Managing child abuse at NRMC Camp Lejeune, N.C.	1	2	3	4
42. Report of Surgeon General's Annual Specialties Advisory Conference	1	2	3	4

Do you have any additional comments, suggestions or complaints about US NAVY MEDICINE?

☐☐☐☐ (Do not mark these boxes.)

DEPARTMENT OF THE NAVY

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Hospital Corps: The Medical Department's Foundation

ON 17 JUNE, the Navy Hospital Corps will observe its 79th anniversary. Over the years, many words have become associated with Hospital Corps men and women and their deeds: honor, patriotism, intelligence, selflessness, heroism, sacrifice, unfailing devotion to duty. No other group has shared as fully the call to service as has this, the proudest of our Medical Department corps.

Hospital Corps men and women perform in arenas as broad as the mission of Navy medicine. Their tasks include the comforting smile and the gentle word at the bedside of the sick, service in the laboratory and the clinic, aid to Marines in combat and to injured sailors at sea.

The message I have for Hospital Corps members is simple and direct: You are the foundation of the Navy Medical Department. Without you, we cannot fulfill our mission. We depend upon your energy, skill, and willingness to accomplish both extraordinary and ordinary assignments. Leadership, example, and the ability to learn and to follow are demanded of you all. Do not become complacent. Do not abandon your desire to learn. By increasing your skills and knowledge, make yourselves ready for the future, whatever it may bring.

Be patient, be understanding, but challenge our system—you are certain to make it better. Remember, your being the best has brought Navy medicine to where we are today.

W.P. ARENTZEN
Vice Admiral, Medical Corps
United States Navy

VADM Arentzen talks to the crew aboard the USS Independence

Aerial view of U.S. Naval Regional Medical Center Okinawa, Japan

Department Rounds

When the Army Goes Navy

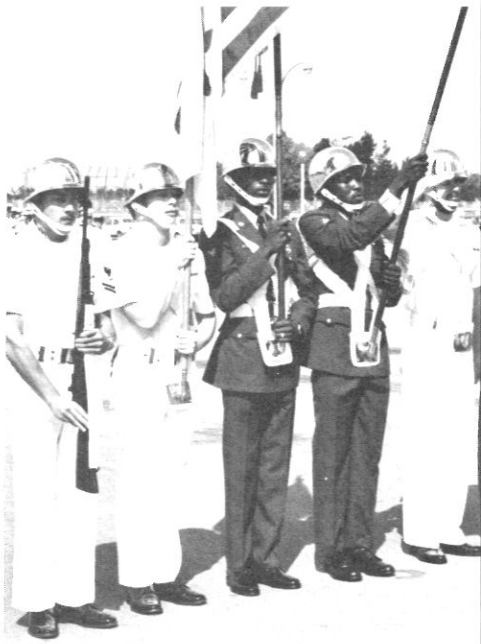
It could have been any Navy change of command ceremony. The outgoing commanding officer and his replacement trooped the line together and saluted the colors as family, friends, and a scattering of VIPs looked on. The new CO gave a speech. At the end, there was a hefty piece of cake for everyone.

But some things were decidedly out of character. The former CO wore a green uniform, while his successor wore full dress whites. The color guard consisted of three Army and three Navy enlisted men. And for the celebration, there were two cakes: one with the seal of the Bureau of Medicine and Surgery, the other with the insignia of the Army Medical Department.

Transition. That's how it was at Camp Kuwae, Okinawa, on 28 Feb 1977, when U.S. Army Hospital Okinawa became a naval regional medical center. The man in green was Army COL Emwood Odom (MC), commanding officer of the Army hospital; his Navy relief was CAPT Charles S. Lambdin (MC), who reported from National Naval Medical Center in Bethesda, Md.

The colorful ceremony capped off a busy year, during which Army and Navy transition teams worked tirelessly to iron out a smooth transfer of personnel and functions. It all began in December 1975, when the Office of Management and Budget directed the Army to transfer some support services in Japan to other military services. The Navy, as the "dominant user" of military facilities in the Western Pacific, was tapped to take over the Army hospital, Makiminato dispensary and Evans dental clinic on Okinawa, as well as the Army medical laboratory at Sagami-Ono, Japan.

Negotiations for the changeover got under way in March 1976, when a team of Army personnel and Bureau of Medicine and Surgery representatives traveled to Okinawa to do the advance work for the transfer. In July 1976, the Navy sent six Medical Service Corps officers and some senior hospital corpsmen to Okinawa to hammer out a transfer plan. The goals: to negotiate memoranda of understanding and interservice support agreements needed to transfer functions from the Army to the Navy, and to set up internal operating procedures for the naval regional medical center. The transition from Army to Navy



Army-Navy color guard presents colors to

COL Odom and CAPT Lambdin troop the line at change of command

RADM R.G. Williams, Jr. and CAPT Lambdin cut cake to celebrate transition

APT Lambdin and COL Emwood Odom

Main entrance of U.S. NRMC Okinawa

personnel was planned in phases, with Navy health care specialists reporting aboard around the same time their Army counterparts left.

Full service. When those Navy replacements arrived at their new duty station, they found an impressive facility. With an operating capacity of 350 beds and a full range of specialty services, the hospital is one of the largest medical facilities in the Far East.

Built of concrete and reinforced steel to withstand typhoons, the hospital is a far cry from the Army's first medical facility on Okinawa: a group of tents hastily set up in April 1945 after U.S. forces landed on the island. That tent hospital was the end point of a complex patient evacuation chain which stretched over the south shore of the island. Litters, three-quarter ton trucks, tanks and ambulances were used to get patients from combat areas to the tents, where medical personnel often worked 24 hours without resting.

After World War II, several Army field hospitals on Okinawa were consolidated at Camp Mercy, where the 9th Station Hospital grew from a "canvas city" to an orderly group of quonset huts. During the Korean conflict, the Camp Mercy hospital supported U.S. operating forces as well as United Nations forces in the Philippines, Formosa and Okinawa.

Construction was begun in 1955 on the hospital used today, and the facility was opened to patients in 1958; six years later, a 125-bed wing was added, giving the building a potential capacity of 700 beds.

When Okinawa was returned to the control of the Japanese Government on 15 May 1972, the Army established its U.S. Army Medical Department Activity, Japan, with headquarters at the Camp Kuwae hospital. In last February's ceremony, that Army activity closed its doors for good, leaving the Navy to carry on its tradition of providing quality medical care to military members in the Far East.

—Story contributed by LTJG G.R. McDougall (MSC). Photos by HM2 E.W. Larson

Health Benefits

CHAMPUS Changes

Rules of the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS) will be enforced more strictly, and program provisions will be easier to interpret, because of a comprehensive new CHAMPUS regulation recently announced by the Defense Department.

Robert N. Smith, M.D., assistant secretary of defense for health affairs, said that the new regulation will help beneficiaries determine what costs CHAMPUS covers or shares, eligibility requirements for the Program, and the procedures for submitting claims. The regulation also introduces an appeals procedure under which beneficiaries and providers can have disputed claims reviewed.

Provisions of the regulation were implemented on 1 June for outpatient services and supplies, and for new inpatients. Care of currently hospitalized, long-term inpatients will be reviewed to determine whether the treatment being rendered meets requirements of the new regulation. If the care fails to meet requirements, these inpatients will receive a 90-day extension before benefits are terminated. The earliest date on which any 90-day notice of termination will be mailed is 1 August, which means that no inpatient benefits will be terminated before 1 November.

Quality emphasized. Dr. Smith pointed out that the regulation emphasizes quality of services, to ensure that beneficiaries receive appropriate treatment from qualified providers. He said it also protects the Government from paying for medically unnecessary procedures and services, and thus contributes to better control of CHAMPUS costs—an area about

which Congress has been concerned. The regulation encourages beneficiaries and sponsors to exercise care in obtaining medical services—the same caution expected of beneficiaries under other health insurance programs.

The new regulation does not change the basic CHAMPUS benefit package. It does, however, clarify CHAMPUS policy and intent in several areas that had been vague or had never been addressed. For example, the regulation specifies that special education under the Program for the Handicapped is covered only if state and local school jurisdictions cannot provide or pay for adequate special education. Also, coverage for alcohol rehabilitation is now limited to three rehabilitative inpatient stays.

Clear definitions. Dr. Smith said the regulation contains clear definitions of benefits available through CHAMPUS. He noted that some beneficiaries have experienced financial hardship because they did not learn of the coverage provided by CHAMPUS, and eligibility requirements for the Program, until after they received care. Another source of confusion and inequity was that contractors interpreted CHAMPUS policy differently in paying claims.

The regulation authorizes the director of CHAMPUS to waive any requirement in the regulation if the requirement is not set forth in any law governing the Program. For example, the director could use this authority to extend benefits for a new medical procedure not covered by the regulation. However, this authority will be used only under unusual circumstances, and will not be used to deny anyone his rights under law or under the CHAMPUS regulation.

Appeals. Although an informal appeals mechanism has always existed for CHAMPUS beneficiaries, the formal procedures spelled out in the regulation are new. A contractor's decision may be appealed in five steps: informal review by the contractor, reconsideration by the contractor (any decision involving less than $51 is final at this level), review by OCHAMPUS (the final level for decisions involving $300 or less), and an independent hearing; as a last resort, the beneficiary can appeal the decision to the assistant secretary of defense for health affairs. A decision made by the CHAMPUS office can be appealed on four levels: informal reconsideration by CHAMPUS, formal CHAMPUS review, an independent hearing (only for decisions involving over $300), and referral of the decision to Dr. Smith's office if the first three steps fail to satisfy the beneficiary.

The CHAMPUS regulation was published in the Federal Register on 4 April 1977, as a DOD operating policy, and interested organizations and individuals were invited to comment. All comments will be considered and may be incorporated in a revised regulation.

Additional information on the new CHAMPUS regulation may be obtained from health benefits counselors at military medical facilities or by writing to OCHAMPUS, Denver, Colo. 80240, or to the Bureau of Medicine and Surgery (Code 73), Washington, D.C. 20372.

Optometry

The Navy's Eye Site

"Join the Navy and see the world" is more than a Navy recruiting slogan promising world travel. At the Naval Ophthalmic Support and Training Activity in Yorktown, Va., the emphasis is on *seeing*—with the best possible prescription eyewear.

The ophthalmic facility, under the command of CAPT M.J. Testa (MSC), fabricates more than 30,000 pairs of spectacles each month for active-duty and retired uniformed services personnel. The activity's primary concern is providing ophthalmic support services to optometry officers and ophthalmologists at Navy medical facilities worldwide.

A complete range of military eyewear is fabricated at the Yorktown facility, including clear and absorptive lenses in all single-vision, bifocal, trifocal, full-field and lenticular aspheric categories, as well as lenses for special equipment such as aviation goggles and gas masks.

Interior of ophthalmic lab, where some 30,000 spectacles are made each month

(The Navy also operates 13 other ophthalmic service units that process only single-vision spectacles.) Some 76% of all lenses fabricated at the Yorktown activity are single vision, while 17% are bifocal and 7% are other types of multifocal lenses and special types such as gas mask inserts. A standard black frame is specified for all Navy glasses except special types. Approximately 15% of lenses fabricated by the facility are tinted.

Lenses are made from both finished and semi-finished stock, most of which is supplied by the Defense Personnel Support Center in Philadelphia. Semi-finished lenses are surfaced, polished and edged in the Yorktown laboratory. All Navy optical specialty prescriptions are also filled there.

Plastic lenses. Some 93% of the lenses fabricated at Yorktown are made of optical plastic, although some glass lenses are still fabricated for certain applications. "Plastic lenses weigh about half as much as glass lenses of comparable size and have good impact resistant qualities," says CAPT Testa.

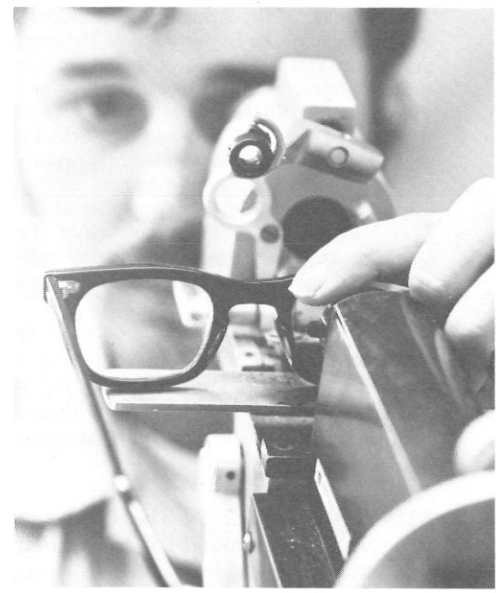
The Navy fabricated most spectacles with glass lenses until December 1972, when the Bureau of Medicine and Surgery directed the Yorktown laboratory to conduct a field evaluation of glass and plastic lenses. "Glass and plastic lens spectacles were issued to Navy and Marine Corps personnel overseas who used them under actual battle conditions," says CAPT Testa. "After one year, the men were asked to return their eyewear to us for examination and evaluation. Also, questionnaires were distributed asking the men about the performance of the two types of eyewear."

"A significant number of the glass lenses had shattered, but not the plastic lenses," CAPT Testa notes. "There were scratches on the plastic, but the lenses were still serviceable and kept the man on the line." Men who returned questionnaires were almost unanimously in favor of the plastic lenses, with wearers citing light weight and impact resistance as advantages.

Technician surveys optical stock items

HM2 Martin checks polishing cylinders

The lab has some 75 spindle surfacers



Inspecting finished pair of glasses

Orders processed. The Yorktown facility stocks about 2,400 different ophthalmic lenses, plus 1,000 other ophthalmic supplies such as surfacing pads and cleaning solution. "In the military, there is always the possibility of mobilization, so we keep plenty of materials on hand at all times," says CDR J.G. Wilcox (MSC), executive officer.

Emergency prescription requests are received by official dispatch or telephone at all hours. Single-vision orders are processed in 24 to 36 hours, multifocals within 72 hours.

The lab's staff includes four officers, 118 enlisted members and 14 civilians. In addition to their regular weekday shifts, laboratory crews work night and weekend shifts to ensure fast processing of all orders.

To staff its ophthalmic service units and the Ophthalmic Support and Training Activity, the Navy Medical Department operates a "C" school at the Yorktown facility for training optician-technicians. This program, recognized by the National Academy of Opticianry, consists of a 26-week course in all aspects of optical work. A typical student is a petty officer second class with five years of naval experience, according to CAPT Testa. Most graduates remain on the Yorktown facility's staff.

The Navy's ophthalmic program, begun when the Navy Appropriation Act of 1942 authorized funds for issuing spectacles to Navy and Marine Corps personnel serving abroad, has grown rapidly in recent years. "To do a good job in the military, one must have good vision," CAPT Testa says. "We're doing our job here to ensure that Armed Forces personnel who need corrected vision have it."

BUMED SITREP

UNIONS . . . Commanding officers are reminded that Department of Defense policy prohibits military members and civilian DOD employees from negotiating military service requirements with labor unions attempting to represent military personnel. A DOD policy statement advises that:

No member of the Armed Forces, or civilian employee of the Department of Defense, may negotiate or bargain on behalf of the United States, with respect to terms and conditions of military service of members of the Armed Forces, with any individual, organization or association which represents or purports to represent members of the Armed Forces; nor may any member of the Armed Forces, or civilian employee of the Department of Defense, recognize any individual, organization or association for any such purpose.

Members of the Armed Forces may join associations which run programs for their benefit, as long as the activities of such groups do not interfere with the lawful operation of the chain of command.

BLOOD DONORS . . . The Food and Drug Administration (FDA) has ruled that naval personnel assigned to ships deployed in areas endemic for malaria (listed in BUMED Instruction 6230.11G) are eligible to donate blood six months after they return to a nonmalarial area, provided:

- they did not have a documented case of malaria during the deployment.
- they have had no symptoms of the disease.
- they have not taken antimalarial drugs since their deployment.
- they meet all other medical standards for blood donors, delineated in NAVMED P-5120.

The six-month waiting period is a change from the Navy's previous policy of requiring a three-year wait, and is the same waiting period usually required by civilian blood donor centers for people who have traveled to malarial areas. BUMED will ask the FDA to make the same change for shore-based personnel who have traveled in certain areas endemic for malaria.

Navy members who have had malaria or have taken antimalarial prophylaxis are still not allowed to donate blood until three years after they become asymptomatic or after therapy ends. Even after three years, it is recommended that they not be used as blood donors if other donors are available, because they may be harboring a dormant form of malaria. Malaria caused by *Plasmodium vivax* and *Plasmodium ovale*, for example, may remain sequestered as long as four years, and disease due to *Plasmodium malariae* has remained dormant as long as 30 years.

OPERATION AESTIVAL HIATUS . . . Medical Corps, Medical Service Corps and Nurse Corps officers of the inactive Reserve are urgently needed for Operation Aestival Hiatus, scheduled for June, July and August 1977. This exercise gives inactive Reservists the opportunity to train in their specialties while relieving critical manpower shortages at overtaxed Navy medical facilities. Vacancies are available in the continental U.S. and overseas.

All Reservists affiliated with the Medical Department are eligible to participate, regardless of their training/pay category. Contact your Reserve Readiness Command medical programs officer for details.

AWARDS . . . The Navy Awards System is designed to recognize individuals or units that have brought distinction upon themselves. When used properly, military awards and decorations can be an effective management tool, providing an incentive for greater effort and helping to build better morale. Injudicious use of awards, however, will destroy their basic value.

Award recommendations that reach BUMED are reviewed by the BUMED Awards Review Committee. Committee members have observed that many recommendations are so full of trivia it is difficult to pick out the facts that justify the proposed award.

The following few steps should help commands prepare clear, informative award recommendations:

- First determine whether the event really deserves an award. Is some other type of recognition—a letter of commendation, for example—more appropriate?
- Begin with a clear, concise statement of the event for which an award is recommended (''HM1 Jones saved the life of a drowning child'').
- In the next paragraphs, give specific details that substantiate the event. Where, when, and under what circumstances did it occur? Who was involved? What happened? What benefits resulted?

Recommendations written in short, clear sentences are the easiest to understand and have the best chance for approval.

Commanding officers and others involved in the awards process should be totally familiar with Chapter 1 of the *Awards Manual* (SECNAV Instruction 1650.1E). That manual contains detailed information on the philosophy of awards, the appropriate time for submitting recommendations, acts which may deserve awards, and acts for which awards are inappropriate.

NEW OUTPATIENT RATE . . . The outpatient rate for medical and dental care provided to civilian employees of the U.S. and their dependents in overseas Navy facilities increased on 1 April from $1 to $20 per diem. The $20 flat rate covers all outpatient medical services—including examinations, tests, diagnoses, treatment, prescriptions, evaluations and consultations—provided to a civilian during a single day.

Certain follow-up visits will be covered by the $20 charged for the initial visit. Also, some outpatient visits will be free: check-in at sick call to make an appointment, prescription refills, physical therapy treatments, and weight checks, for example.

When immunizations are the only service provided, the charge will be $1 per vaccination. However, if the patient is vaccinated as part of a visit for which a $20 charge is imposed, there is no additional charge for the immunization.

For full details, see BUMED messages P241833Z and 091414Z, which were sent to activities affected by the change.

APPOINTMENTS . . . CDR A.D. Hatten, Jr. (MSC) and LCDR Lee N. Hilling (MSC) have been named to the Secretariat of the new Department of Defense Health Council in the Office of the Assistant Secretary of Defense (Health Affairs). The Council was established in January by the Secretary of Defense to plan and evaluate military health care operations. As Secretariat members, the two management analysts, formerly of BUMED, will provide administrative support to the Council and develop issue statements, programs and reports for the Council to consider at monthly meetings.

NAVMED Newsmakers

Here's one from the small world department: Back in the early 1960's, CAPT **Mary Conley** (NC), then LT Mary Nester, was recruiting Navy nurses at universities and nursing schools in the Northeast, while Army Nurse Corps recruiter LTC Roberta Hawkins (then CAPT Roberta Scott) was prowling the same territory. The two nurses saw a lot of each other on tri-service recruiting visits and became friendly rivals. Tours completed, they went their separate ways. This year, when the Navy took over U.S. Army Hospital Okinawa, CAPT Conley was sent to Okinawa to take charge of the hospital's nursing service. Who should be on hand to greet her? LTC Hawkins, just finishing her tour as assistant chief of the nursing service.

Conley & Hawkins: Small world

Leonardo, **Rolando** and **Rodolfo Rodriguez** have more than their last name in common—the three brothers, all hospital corpsmen, were recently promoted at the same time, Leonardo to HM1 and Rolando and Rodolfo to HM3. The brothers serve side by side at U.S. Naval Hospital Subic Bay, under the Navy's policy of assigning family members to the same duty station when possible.

Rodriguez brothers: All in the family

While the class of 1977 dozed through graduation speeches at Georgetown University Dental School, class president ENS **Stuart Jones** was halfway round the world —climbing Nanda Devi, a 25,645-foot mountain in the Himalayas. The 31-year-old graduate and his fellow climbers, who had been planning their assault on the remote peak for more than a year, left for India in early May, hoping at least one of them would reach the summit by 18 June. When ENS Jones returns, he'll take on a different kind of challenge: treating patients at Naval Regional Dental Center Camp Pendleton, Calif.

Another Medical Department member also did some cliffhanging recently, although not for recreation. HM3 **David A. Vezina** flew with a search and rescue helicopter team sent from Naval Air Station, Lemoore, Calif., to retrieve a climber stranded on a ledge in Yosemite National Park. As the pilot positioned the aircraft in a hover 50 feet above the rescue site, HM3 Vezina rappelled down to the ledge. Finding the climber in good condition, Vezina tied himself and his patient to the helicopter's hoist and the two men were lifted to safety. It was the fifth rescue for the 22-year-old corpsman, a four-year Navy veteran.

Creative CDR **Robert Jordan** (MSC), staff physicist in the Nuclear Medicine Department at NRMC Oakland, has come up with a design for a more efficient, economical automobile engine. His newly patented invention burns fuel more completely and produces less pollution than most internal combustion engines. What's next on the drawing board? CDR Jordan hints at a portable, practical source of power for X-ray equipment.

HM3 Vezina: To the rescue

Field Medical Service School:

Combat Training That Works

The instructors at the Field Medical Service School (FMSS), Camp Pendleton, speak as if they're biting on bullets.

"This exercise," says HM1 Howard Huey, "can last as long as you'd like—and I don't think you want it to last very long. It gets cold up in the hills at night, and you're going to want to finish early, so let's get going."

With those words, 163 hospital corpsmen begin a seven-mile march into the narrow, dusty canyons on the fringe of the Camp Pendleton Marine Corps base. Stuffed into camouflage utilities and wearing grim expressions, the men share nothing more than anonymity at this point.

The situation changes when the class reaches the campsite and begins its military training exercise. For the next three days, instructors will coordinate and students will participate in war games designed to teach survival tactics, concealment, camouflage, movement under fire, map reading, communications, and mine and booby trap detection. "The students learn that they have to pull together and function as a unit," HM1 Huey says. "If they don't do it here, they won't do it in a combat situation, and people are going to die."

According to ENS Stephen Van Zee (MSC), assistant training officer, the five-week FMSS course prepares corpsmen to serve with Marine Corps combat units. "It's a simple enough goal," he says, "but we have problems achieving it. The physical conditioning is rough. We have to pack a lot of instruction into a short period of time."

ENS Van Zee believes the biggest problem is trying to simulate a wartime situation in peacetime. "Most students know they're probably never going to see combat," he says. "Still, we have to prepare them for that possibility."

Most FMSS instructors are Vietnam combat veterans. ENS Van

Field work includes crossing hostile territory (left) and treating a "patient's" emotional breakdown (above)

Moving under fire to help wounded buddy is part of training exercises

Zee, a former corpsman and a Vietnam veteran, believes the instructors' Vietnam experience gives them an important frame of reference the students lack. "We've treated combat casualties and realize how much the troops depend on us," he says. "In wartime, a corpsman is the greatest thing to come along since sliced bread."

Pell-mell pace. The FMSS course has been taught eight times a year since 1950. The first class consisted of 80 corpsmen who had been recalled to active duty with Marine Corps Reserve units. That course lasted only two weeks.

Today, in the four-week classroom phase, students learn Marine Corps uniform and grooming regulations, and command structure and function. Training continues with a tear gas demonstration and demonstrations of medical evacuation techniques, emergency first aid, cardiac care and treatment of shock and psychological casualties. Students also learn how to deal with fractures, burns, communicable diseases and poisoning. All are expected to learn how to fire the .45-caliber pistol and M-16 assault rifle.

The pell-mell pace—reveille is at 0430—leaves most students exhausted. "They don't have the strength to dwell on their complaints at the end of the day," ENS Van Zee says.

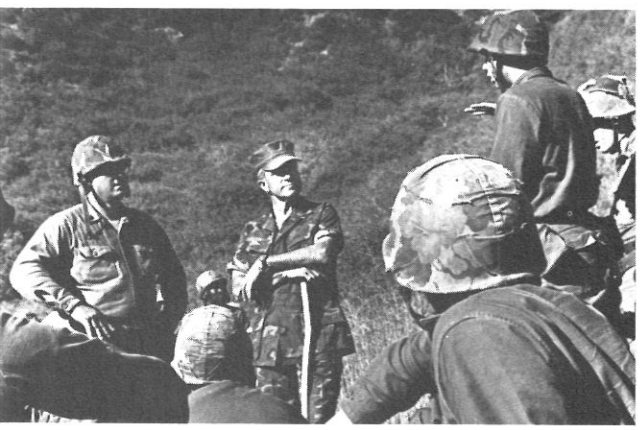
During military training, students are divided into four teams. Some students man the battalion aid station, while others serve as corpsmen and litter bearers. Roles are then switched to give each student an opportunity to use what he's learned in the classroom.

Realism. The cries echoing through the canyons are part of the realism instructors hope the students will inject into the exercise. "Doc! Doc!" cries one man, holding his leg and rocking from side to side. A corpsman decides the patient's leg is broken and begins setting it.

"I have a bleeder over here," another corpsman yells. "Get me some litter bearers."

A different kind of crisis is taking place a few yards away: someone has had a nervous breakdown. His eyes are saucer-wide and he's screaming obscenities at the corpsmen surrounding him.

"Hold him down!" one corpsman orders.



Instructors explain combat tactics after students finish 7-mile hike

"Take it easy, buddy," another says soothingly, trying to get a grip on the flailing patient.

"He'll get a shot of Thorazine when the guys get him to the aid station," says a third student.

"This is more like it," says an instructor surveying the scene. "Now the students are showing some interest in what they're doing."

"There's still a problem with levity, though," another instructor notes. "The students often enjoy the 'war games' so much that they forget what they're here for. Then we have to begin the whole exercise over again."

Benefits. HMCS Craig Grothaus believes the FMSS course should be a requirement for all corpsmen. "Of course, we're at peace, and it's hard to simulate war with any degree of effectiveness," Chief Grothaus says. "But the number of combat casualties in Vietnam is proof that our training is necessary."

"This program works," Chief Grothaus adds. "The men trained here survive, and their troops survive. I'm grateful if a student realizes that much."

Other instructors report a keener sense of professionalism on the part of both teachers and students in recent classes. Why? "The instructors are making the classes as interesting and informative as possible," explains HMC Homer Starr. "And the students are responding with more enthusiasm."

The FMSS course has some fringe benefits. Students can register with Palomar Community College and earn six college credits by mastering emergency medical techniques. Another credit is available for passing the final physical fitness test. And, of course, there's the modest cachet a student acquires for qualifying as a combat-trained corpsman.

No women are enrolled at FMSS, although ENS Van Zee says, "We're ready for them. Plans have been made in case we receive permission from the Bureau of Medicine and Surgery to accept women."

There are problems at FMSS, but only if you measure the actual program against the ideal. "It would be ideal if the classes could be smaller, so we could get to know each student personally," ENS Van Zee says. "It would be ideal if we could accept women today, and if all our students were highly motivated."

"But we deal in realities," says ENS Van Zee, "and we have to capitalize on our strengths and weaknesses. It's a challenge for both instructors and students."

—Story by JO3 Glenn Amato. Photos by PH2 R. Weissleder and LCPL N. LaLuntas.

Scholars' Scuttlebutt

Reflections in the Wake: Two Decades of Navy Medicine

CAPT Tor Richter, MC, USN

The Service, the Service,
you ought to join the Service.
The Army, the Navy,
at very generous pay.

That stirring recruiting song was a show-stopper at the 1951 Aesculapian Club extravaganza. Its lyrics, and especially its percussive climax —Da *Dum* Di *Dum* Di *Dum*—gave lighthearted if heavyhanded expression to a truth as enduring as most anything else we were taught during those four years: military medicine is not every Harvard graduate's cup of tea. Well, first-nighters, here it is 25 years later, and a few of us marched off to a different drummer. Surely you will not expect a cautious bureaucrat—"full of high sentence but a bit obtuse"—to attempt anything offhandedly cosmic. A few "sea stories," perhaps, ventured less for their intrinsic interest than for the parallels they may call up in your own experience. No pearls, then, but with luck maybe a few grains of sand.

One generally thinks of the military in terms of uniformity and interchangeability of parts. For the physician, nothing could be farther from the truth. My career as a Navy doctor has been typical only in its variety. I have had a mixture of clinical, administrative and operational assignments. In peacetime, naval hospitals are similar to civilian hospitals. And of my administrative duties the less said the better. I will speak of my experiences in operational medicine.

A medical officer assigned to operational duty quickly acquires an altered perception of the concept of the fitness of the environment. Sailors and Marines experience adverse environments far beyond those encountered by all but a small number of adventurous civilians. Heat and cold, wind and wave, height and depth, noxious creatures great and small.

Not only are military environments severe and unforgiving, but they lack the potential of being brought under control that is common in civilian life. Thus the farmer can rid his stable of rats, his fields of venomous snakes. He will heat his house and find safe water. An invading force crossing those fields or occupying that house does not have the luxury, at least for a time, of environmental control. Therefore in the military the emphasis must be on individual protection, rather than on what by contrast might be termed the public health approach to the prevention of disease or injury. What used to seem to me the maniacal interest of the Armed Forces in immunization is a manifestation of this phenomenon.

Yet these adverse environments, like other adversities, have their sweet uses as well. They represent workings of nature apart from the beaten path no less than do rare diseases or genes gone astray. Here also we may expect to find clues that clarify normal physiology and biochemistry.

A simple example from diving physiology—the diving injury known as "squeeze"—may help illustrate this. Everyone who has dived even in a moderately deep pool knows that you must equalize the pressure in your ears and sinuses in order to avoid pain and injury. Naturally the air to do this comes from that already in the lungs. Unless one has a scuba tank or an air hose, this gas supply is limited to whatever was inhaled prior to the dive. The "obvious" prediction then is that the depth limit of breath-holding diving is determined by the ratio of gas in the lungs to that in the rigid air-containing chambers such as the middle ear, trachea and sinuses. This ratio is roughly five to one, which translates as a breath-hold diving limit of five atmospheres absolute or 165 feet. In actuality, dives to depths greater than 240 feet have been reliably documented. Though the average Navy diver is sometimes credited with wearing a size 52 coat and a size 6 hat, we know that other factors must be at work. There is during breath-hold diving an intrathoracic shift of blood which greatly reduces the residual volume. In short, a human under these conditions behaves rather more like a diving mammal than we would have thought when we heard Don Fawcett describe the dugong and manatee a few years back.

The Navy is currently sending more of its medical officers on brief tours to sea than it formerly did. This practice has met with some resistance, particularly from specialists whose experience has been limited to hospitals, and who regard shipboard assignment both as a waste of their specialty training and as potentially threatening if condi-

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Medical officers make ward rounds aboard USS Kitty Hawk

tions outside their specialty present. Those who have completed sea tours, though, have usually been glad they went.

There are several reasons for this. The fascination of the sea and ships is one. The old prescription of a sea change is good for the doctor, too. On a man of war, there is the fascination which familiarity does not diminish in watching complex and dangerous evolutions such as carrier landings and missile launchings. The physician assigned to sea duty learns a lot in a hurry, though most of his new knowledge is not medical in the narrow sense. Nevertheless, medical training permits a view of the ship and its operations that is unique to the medical officer, and with experience he becomes an active participant rather than a mere passenger. He ranges far from his sick-bay to inspect the ship, and to participate in emergency drills and occasionally in real emergencies. He comes to see the ship as the site of a thousand potential accidents. Everywhere there is stored potential energy, pressurized flasks, taut lines, unburned fuel. Accident and even disaster prevention are a matter of constant preparation and training. In shipboard safety there are even quasi-philosophical issues such as the amount of time and equipment allocated to preparing for various contingencies. American submarine commanders, for example, give very little attention to escape from sunken submarines. Instead, they concentrate on keeping the submarine from sinking.

The Navy clinician who spends even a short time at sea will better be able to do his job when he returns ashore, for he gains a far better idea of the work environment from which his active-duty patients come and to which they return. More than one sailor has appeared at the quarterdeck of his ship, "Full duty, fit for same," in a long leg cast.

Even the most cerebral specialist can enjoy and profit by this sort of practical sabbatical. One of the Brigham surgeons—I think it may have been Professor Moore himself —had an aphorism that there was no such thing as minor surgery, only minor surgeons. So it is also with shipboard medicine.

And there is another more general sense in which a hospital based military doctor can gain refreshment and even inspiration from working directly with the operating forces. He really sees what the Navy *does*. It is a particularly good antidote to the disillusionment which may come from daily reading about national indecision and lack of direction. Best fun of all is to talk to the young men who speak with shining eyes about their respective crafts. Lives depend on them. They are good and they know it. But for the Navy, they might be parking cars and pumping gas looking for that way back to San Jose.

Operational medicine then, besides being necessary, is educational and stimulating. Few make an entire career of it, though. For most, an early operational tour is followed by further training, clinical or research duties, and if fate dictates, those administrative posts euphemistically called positions of leadership. A Navy career thus tends to converge with civilian medicine. The senior Navy physician, like many of you, approaches his work wondering if he is twisting the right knobs or indeed if the knobs are hooked up to anything. One becomes reflective, and even reflects on reflections.

One of the first things that happened to me after I came into the Navy was to be interviewed by Admiral Rickover. These interviews were conducted in an atmosphere of seriousness which in retrospect seems comic. Most of the things Admiral Rickover said to the interviewee were not intended to put him at his ease. One of the first remarks he made to me that day was, "Richter, joining the Navy Medical Corps is like joining a last-place ball club." I am sure now that he was putting me on, but I took him literally at the time, and an animated discussion followed. I find that even now I cannot think about that exchange without a certain amount of heat—maybe because he touched on something that could so easily be true. The Navy medical officer, with his variety of assignments, is at risk of becoming a dilettante. Frequent rotations of assignment diffuse responsibility, and where many are responsible, none may be in charge. Finally, the Navy needs identity without parochialism. This chronic problem has become acute with the end of the doctor draft and dependence on volunteers. We miss the leavening young physicians bring from civilian life and the understanding they take back with them on their return. Most of all, we face the difficult task of maintaining quality among our volunteers.

I hope George Murphy and the other Aesculapians have kept their voices in tune. It may soon be time for another chorus.

Safety Tips

Safety in Anesthetizing Areas

The National Fire Protection Association (NFPA) standard, *Inhalation Anesthetics* (NFPA 56A), last issued in 1973 and now being revised, outlines safety requirements for hospital anesthetizing locations. Terms used in the standard are:

Anesthetizing location: Any area of a hospital in which it is intended to administer any flammable or nonflammable inhalation anesthetic agents in the course of examination or treatment. These areas include operating, delivery, emergency, anesthesia and utility rooms, as well as corridors and other areas used for induction of anesthesia with flammable or nonflammable anesthetizing agents.

Nonflammable anesthetizing location: Any operating, delivery, anesthesia induction, emergency, treatment, or other area permanently used for, or intended for the exclusive use of, nonflammable anesthetics.

Flammable anesthetizing location: Any room or area used or intended for the use of flammable anesthetics.

The Bureau of Medicine and Surgery determines these areas in the design of Navy medical facilities. BUMED Instruction 5100.5A of 5 Sept 1974 prohibits the use of flammable anesthetics in all Navy medical facilities except graduate teaching hospitals, which must maintain at least one area for training staff members in the use of flammable anesthetics.

The requirements of the NFPA standard on inhalation anesthetics are summarized below:

Humidity and air: In anesthetizing areas, humidity must be at least 50% for temperatures between 5°F and 70°F. (The Joint Commission on Accreditation of Hospitals requires that the humidity in each operating room be recorded daily.) In flammable anesthetizing locations, humidity provides a conductive path—because carbon dioxide in the air combined with water produces carbonic acid—to dissipate static charges. In nonflammable anesthetizing locations, humidity is believed to control airborne bacteria.

In the current edition of NFPA 56A, there are no requirements regarding the amount of air that must be maintained in anesthetizing areas, but the appendix recommends that the total volume of air in the room be changed 25 times per hour, to help dilute any bacteria that people bring into the room. The appendix also recommends that positive pressure be used in the operating room to prevent airborne bacteria from entering the room; no pressure differentials are suggested. (Appendix information is advisory, not mandatory.)

Gas storage: Medical gases should be stored in racks or fastenings to prevent accidental damage of gas containers. Oxidizing gases such as oxygen and nitrous oxide should be stored separate from flammable gases.

Gas pipeline systems: NFPA 56F, *Standard for Nonflammable Medical Gas Systems*, advises that an accessible, clearly identified shutoff valve should be located outside each anesthetizing location, to be used in emergencies; however, each connection in the system must use a non-interchangeable coupling. For threaded connections, the standard is *Diameter Index Safety System*, Compressed Gas Association Pamphlet V-5. For cylinder valve outlet connections, the standard is American National Standard ANSI B57.1-1965. No piping systems shall be used for flammable gases.

Electrical distribution system: The anesthetizing area must have a local ungrounded or isolated electrical system, consisting of an isolation transformer and a line isolation transformer. The isolation transformer helps prevent electrocutions that might occur because floors are required to be conductive. The isolated system also prevents micro-shock (ventricular fibrillation stimulated by micro-amperes of current applied to the heart), if equipment is adequately grounded. The isolated system gives some protection from electrical injuries that can occur in wet areas, which are common in emergency rooms. This system also maintains continuous electrical service with a line-to-ground fault, and makes it easier for workers to assess the condition of equipment.

Equipotential grounding system: NFPA 56A requires an equipotential grounding system for all hospitals. Electric current cannot flow without a voltage; therefore, no current can flow through a patient if an anesthetizing area has no potential (voltage difference). The equipotential grounding system must be maintained in accordance with NFPA 56A.

Grounding jacks and plugs: The standard prescribes types of grounding devices to be used. All conductive surfaces—even those not electrically powered—must be grounded. For example, back tables, anesthesia machines, and mayo stands must be grounded.

Receptacles and plugs: In flammable anesthetizing areas, explosion-proof plugs listed for the purpose are required; "listed for the purpose" means that a testing organization, such as Underwriters Laboratories or Factory Mutual, has tested and approved samples of the item. For nonflammable locations, the three-con-

ductor, twist lock plug is required. The *National Electrical Code* (NFPA 70) allows the three-prong, U-ground type of plug that is listed for the purpose to be used in flammable anesthetizing locations.

Lighting: Current for ceiling-suspended fixtures, such as operating room lights, must be supplied from isolation transformers so that people who touch the light will be protected from electric shock. Lights for general illumination can be attached to the normal grounded electricity supply.

Portable electric equipment: To be safe, portable equipment must operate at eight volts or less, be moisture resistant, and have double insulation. Power must be supplied by an isolation transformer or battery.

Administration and maintenance: Everyone who works in anesthetizing locations must understand the hazards of using anesthetics. Licensing and other hospital approval organizations should look for compliance with NFPA requirements when inspecting facilities.

Appendix B of NFPA 56A includes three sets of proposed regulations that apply to flammable, nonflammable, and mixed anesthetizing locations. Safe methods for handling gases, cylinders, electrical systems, and anesthetizing equipment are also described in this appendix.

This discussion has covered the basic requirements in NFPA 56A which pertain to *all* anesthetizing locations. In the next issue of *U.S. Navy Medicine*, there will be a summary of the NFPA's specific requirements for flammable, nonflammable and mixed anesthetizing facilities.

Disposing of Health and Dental Records

Health and dental records of Marines whose active duty is terminated on or after 1 July 1977 will now be closed and delivered immediately to the command maintaining the member's service record or officer qualification record.

This change, which will be described in Change 91 to the *Manual of the Medical Department*, is the sixth and final phase of the Master Medical Record Concept. Under that concept, each member of the naval service has only one health and dental record which, when the person is separated from active duty, is combined with his or her service record.

In the first phase of master medical record implementation, medical and dental information which had been maintained at BUMED on active-duty Navy and Marine Corps personnel was returned to each member's command to be incorporated in the member's health and dental record.

In Phase II, medical and dental records held in BUMED on inactive Navy reservists were forwarded to the Naval Reserve Personnel Center in New Orleans; records of drilling reservists went to their commands for incorporation into their health and dental records.

Phase III provided for the health and dental records of Navy personnel whose active duty ended after 30 June 1976 to be closed and sent to the command maintaining the service record.

In Phase IV, medical and dental information on Class II drilling Marine reservists was forwarded to their commands for incorporation into their health and dental records.

Phase V provided for health and dental records held by BUMED on Class III inactive Marine reservists to be sent to the Marine Corps Reserve Forces Administrative Activity in Kansas City, Mo.

After Phase VI is completed on 1 July, health and dental records of Navy and Marine Corps personnel who leave active duty will all be disposed of in the same way: the records will be closed out and placed permanently in the member's service record.

All naval commands holding health and dental records of Navy and Marine Corps personnel should disseminate the above information widely, and ensure that record keepers are aware of and comply with the provisions of Change 91 to the *Manual of the Medical Department.*

Mass Screening for Blood Donor Eligibility

Mass screening of individuals to determine their eligibility as blood donors has been used successfully at many naval blood donor centers. This practice is acceptable provided:

- the interviewer explains each question concerning prospective donors' medical histories.
- time is allowed for the potential donors to answer questions accurately on the medical history form and to ask any questions they may have.
- final determination of suitability is made separately for each individual, in a semiprivate atmosphere, by qualified Medical Department personnel.

Most questions about medical history on the Donor Record (DD Form 572) can be answered only by the individual. One exception may be recruits, who are often confused about the type of immunizations they received during training and the dates they were immunized. The donor center supervisor is responsible for ascertaining from the recruit command, on the day blood is donated, the kind and dates of inoculations received by a group of recruit donors. However, information received from the recruit command cannot substitute for information obtained through personal donor screening, because individual differences can exist.

Notes & Announcements

APPLICANTS NEEDED FOR HOSPITAL CORPS "C" SCHOOLS

The Hospital Corps urgently needs applicants for the following "C" school courses: Nuclear Submarine Medicine Technic (HM-8402), Nuclear Medicine Technic (HM-8407), Aviation Physiology Technic (HM-8409), Advanced Hospital Corps School (HM-8425), Otolaryngology Technic (HM-8446), (Basic) Biomedical Equipment Repair (HM-8477), Operating Room Technic (HM-8483), Neuropsychiatry Technic (HM-8485), Special Operations Technic (HM-8492), and Medical Deep Sea Diving Technic (HM-8493).

Applicants must be qualified for assignment to "C" school training. For further information, contact the "C" Schools Coordinator, Bureau of Medicine and Surgery (Code 34), Navy Department, Washington, D.C. 20372, Autovon 294-4682.

NRMC PORTSMOUTH WILL OFFER NURSING COURSES

The following courses for Navy nurses (in addition to those announced in *U.S. Navy Medicine*, April 1977) will be given at Naval Regional Medical Center Portsmouth, Va. in 1978. For further information, contact LCDR Shirlee C. Hicks, NC, USN, Educational Coordinator, NRMC Portsmouth, Va. 23708.

1978

30 January-17 February	Coronary care workshop for nurses (90 contact hours)
20-31 March	Critical care workshop for nurses (60 hours)

ABBREVIATED CLINICAL RESIDENCIES AVAILABLE

Navy physicians serving in operational or managerial billets may now apply for a short clinical residency to renew skills before starting a more comprehensive clinical assignment, under a new program announced in BUMED Notice 1520 of 11 March 1977.

The period of training (not to exceed 20 weeks) and the content of each abbreviated residency will be tailored to the needs of the physician. Training will be in facilities that can provide the required clinical experience in the least possible time at the least expense—usually Navy graduate medical training centers and regional medical centers. Such training will normally be accomplished in association with a permanent change of station move.

To ask for an abbreviated clinical residency assignment, medical officers must submit a letter explaining why they want the training and what professional benefits they expect to gain from it. Requests must be submitted to BUMED (Code 0011) early enough to allow time for selection of a training site and for the physician and his preceptor to plan a suitable program. The commanding officer of the training facility will assign the director of clinical services or an equally qualified physician as preceptor. When a medical officer completes the abbreviated residency, the commanding officer will send a letter describing the physician's accomplishments to BUMED (Code 0011). Each abbreviated clinical residency may be evaluated for possible continuing education credit.

RETIREMENT POINT CREDIT FOR ATTENDING PROFESSIONAL MEETINGS

Reservists who want retirement point credit for attending professional meetings should refer to BUPERS Manual, Article 6610260 and DOD Directive 1215.7 of 19 Dec 1974. These references indicate that retirement point credit may be given to a Reservist for attending a professional meeting only when the meeting will aid his professional development and prepare him for mobilization assignments. The meeting must occupy at least two hours a day and last no longer than five days. The value of a meeting is determined by the Chief, Bureau of Medicine and Surgery. The meeting's content and objectives must relate clearly to the Reservist's mobilization assignment, designator, and clinical specialty.

Authorization for retirement point credit must be obtained before the meeting. Requests, including a copy of the agenda, must be forwarded 30 days in advance to the Chief, Bureau of Medicine and Surgery (Code 36), Navy Department, Washington, D.C. 20372. Once a meeting has been approved, it is approved for all Reservists in the appropriate designator and specialty.

RETIRED PAY COMPUTATION CHANGES

Active-duty personnel can now compute their retired pay easily by using new information contained in change 1 to BUPERS Instruction 7220.27.

The change describes years of service creditable for multiplier and basic pay purposes. Individuals can compute their retired pay for key dates in their career, and compare past and present pay rates.

Under retired pay inversion legislation passed last year, individuals may not receive less retired or retainer pay than they would have received if they had retired at an earlier date. By following the computation process described in the revised instruction, military men and women will be able to determine the highest pay they were eligible to receive at any time during their career.

The revised instruction also contains the latest basic pay tables and current consumer price index adjustments.

Features

The Mysteries of Sleep

Laverne C. Johnson, Ph.D.

How much sleep do we need? Is deep sleep better than catnaps or dozing? How long can we go without sleep? Must we get our sleep in a single chunk or can we take it in "three square naps" a day? These questions have been keeping staff members at the Psychophysiology Division, Naval Health Research Center, San Diego, awake at night.

NATURE OF SLEEP

In the past 20 years, there has been a dramatic increase in research on the one-third of our lives most of us spend sleeping. One consistent finding: sleep is not a quiet period, nor is it a period of unconsciousness. Sleep has its own unique pattern of physiological, biochemical, hormonal and mental activity.

Consider the electrical activity of the brain. Electroencephalographic (EEG) studies show that sleepers' brain patterns vary from the low-amplitude brain-wave patterns of sleep onset to the high-amplitude delta (1 Hertz) waves of deep or "slow-wave" sleep. Rapid eye movements (REMs) during sleep are associated with a low-amplitude EEG pattern very much like the pattern seen during sleep onset (*1,2*). During this REM stage of sleep, the subject is most likely to dream, although dreamlike mental activity occurs in all sleep stages. (It was the belief that they had identified dreaming, the royal road to the unconscious, that sparked much of the enthusiasm of early sleep researchers.)

When subjects are wired for sleep recordings (Figure 1), EEG patterns typical of the five sleep stages are seen (Figure 2). These clearly defined EEG patterns dispelled the belief that sleep was a homogeneous state which varied only in depth. Instead, during sleep a person goes through a regular pattern, as shown in the sleep profiles of two subjects (Figure 3). Each subject begins with stage 1, goes on to stages 2, 3 and 4, then back to stage 2. From 90 to 100 minutes after sleep on-

Dr. Johnson is head of the Psychophysiology Division at the Naval Health Research Center, San Diego, Calif. 92152. He is also associated with San Diego State University and the University of California at San Diego.

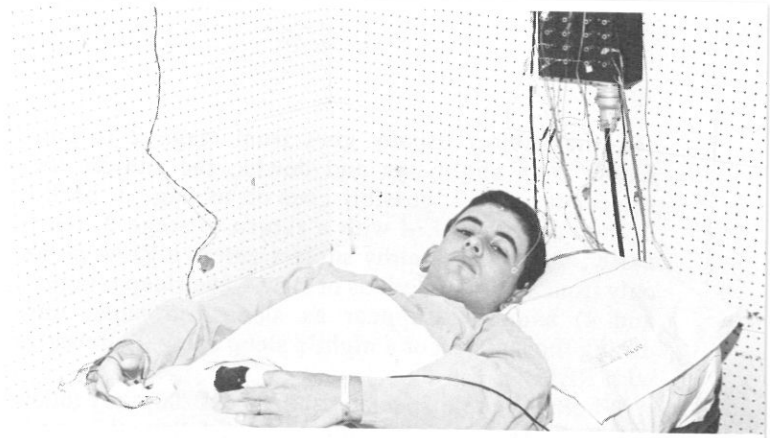

FIGURE 1. Subject wired for an all-night sleep study at the Naval Health Research Center sleep laboratory.

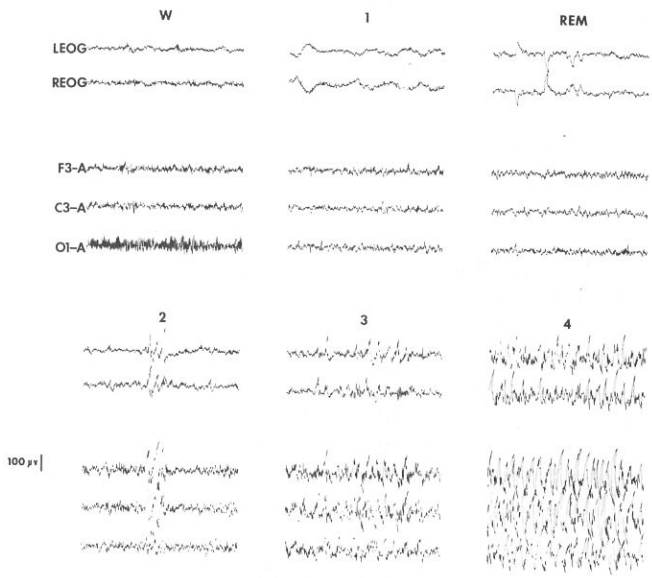

FIGURE 2. Electroencephalograph readings show a subject awake (W) and in five stages of sleep: 1, REM, 2, 3, and 4. Each reading covers about 20 seconds. LEOG and REOG mean left and right electroculogram referenced to mastoid. F3-A, C3-A and 01-A indicate (respectively) left frontal, central, and occipital electrode referenced to mastoid.

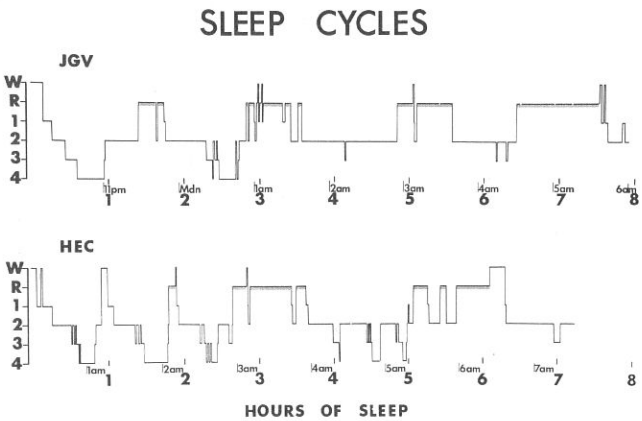

FIGURE 3. All-night sleep profiles of two young adult males. The subject of the upper profile went to sleep at 2200, while the subject of the lower reading began sleeping near midnight.

set, the subject usually goes from stage 2 to stage REM. With slight ups and downs, the subject then returns to stage 2, possibly goes on to stage 3, back to 2, then again to REM with a return to stage 2. (Ordinarily, a normal, healthy subject enters a REM period only from stage 2.) Periods of slow-wave sleep (stages 3 and 4) usually disappear as sleep continues, until during the last part of a night's sleep stage 2 alternates with REM.

Whether people go to bed at 2200 or 0200, they follow the same cycle. Night workers also follow this cycle during daytime sleep. The average young adult spends 6% of his or her sleep time in stage 1, 50% in stage 2, 7% in stage 3, 16% in stage 4, and 20% in stage REM. About 1% of sleep time is occupied by body movements. As people grow older, the sleep time they spend in stage 4 decreases until after age 60 stage 4 may be absent; other sleep stages do not change as dramatically with increasing age. There are no major differences between males and females in total sleep time or pattern of sleep.

In the early days of sleep research, some scientists believed that adequate amounts of REM sleep, with its vivid dreams, are crucial for emotional health. Others believed that stages 3 and 4 (slow-wave sleep) are necessary for sleep to be restorative. Research in our laboratory (*3,4,5*) as well as in other sleep centers has shown that neither belief is correct: there are no firm data to show that the amount of time spent in REM or in slow-wave sleep affects behavior or performance when an individual is awake. The significance of sleep stages remains an unsolved mystery.

HOW MUCH SLEEP?

The total *amount* of sleep appears to be the most important factor affecting awake behavior and performance. When we asked 750 students at the Naval School of Health Sciences, San Diego, how long they sleep, the most obvious difference was the wide variations in the amount of sleep reported. A preliminary analysis of our survey also suggests that sleep lengths of these Navy students are shorter than students' sleep lengths reported by Webb (*6*) at the University of Florida. Of more than 4,000 students entering the University, 7% said they slept less than 6½ hours each night and 3% reported more than 9½ hours each night; most students slept between 7 and 8 hours. Thirty-five percent of the naval students said that on workdays they usually slept less than 6½ hours; less than 1% slept more than 9½ hours on workdays. On weekends, 12% reported sleeping less than 6½ hours, but 22% slept more than 10 hours to make up for sleep lost during the week.

The easiest way for people to tell whether they are getting enough sleep is to note their sleep habits and their condition after waking. If someone needs an alarm clock to wake up, tends to doze off shortly after getting

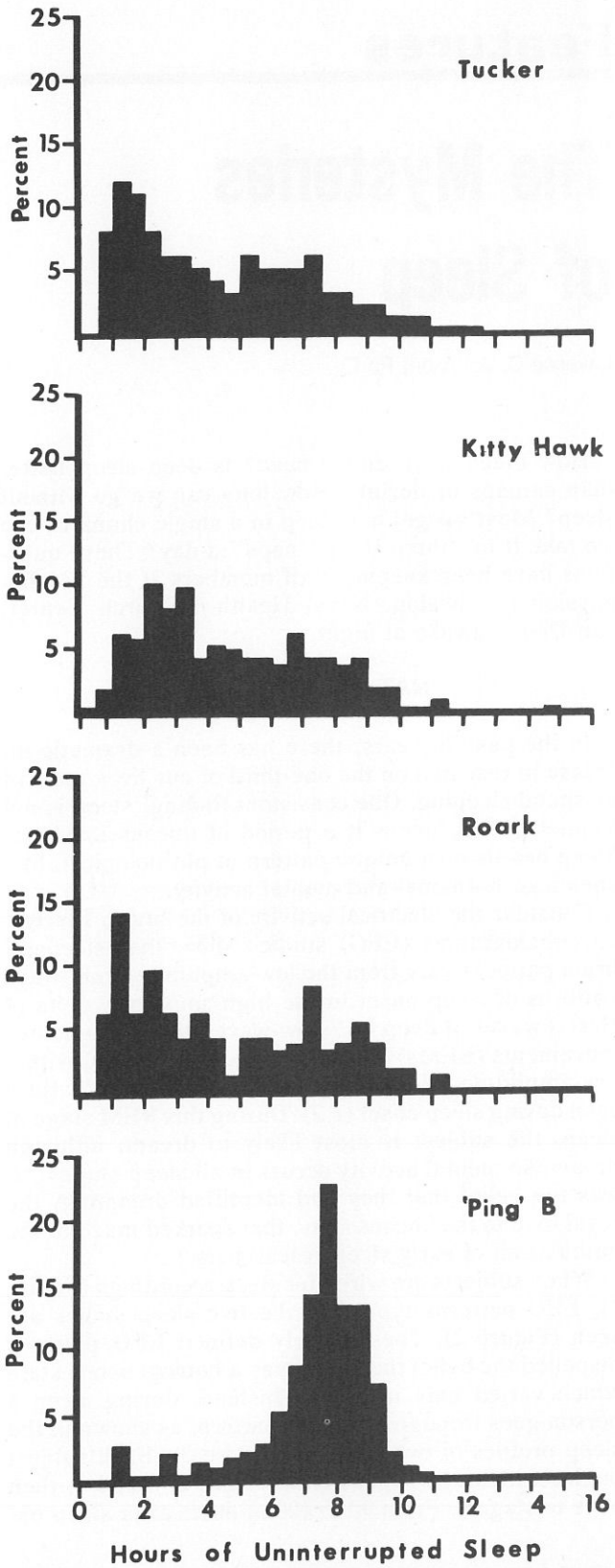

FIGURE 4. Profiles show periods of uninterrupted sleep for crewmembers aboard the USS Tucker, USS Roark and USS Kitty Hawk, and among shore-based personnel ('Ping' B).

up, or falls asleep during lectures, conversations, or reading—and if there are no contributing health problems—he or she probably needs more sleep.

While regular sleep habits do not necessarily ensure an adequate amount of sleep, irregular sleep habits almost always lead to a sleep debt, and may cause disorders in chemical and physiological rhythms which are normally on a 24-hour schedule. In the Navy it is difficult to maintain a regular sleeping schedule during shipboard watch schedules. About three years ago, Paul Naitoh, Ph.D., a psychologist on our staff, compared sleep schedules aboard the carrier USS *Kitty Hawk* and the destroyers USS *Tucker* and USS *Roark* with the sleep of men in land-based barracks (called 'Ping' B in the study). Under 'Ping' B conditions, 75% of the men's sleep was uninterrupted for 6 to 9½ hours, and the group's sleep pattern was symmetrical (Figure 4). But shipboard sleep differed considerably: only about 30% to 35% of the crew obtained 6 to 9 hours of uninterrupted sleep, while approximately 50% of the crew got less than 4 hours of uninterrupted sleep.

Even more striking was the disruption of the sleep/wake cycle in shipboard sleep (Figure 5). Most of us prefer a schedule of 8 hours of sleep followed by 16 hours awake. 'Ping' B conditions reflect this preference, with most subjects reporting 16 to 18 hours between sleep periods. Again, shipboard sleep was dramatically different: the sleep/wake cycle was clearly fragmented, with the time between sleep ranging from 1 to 22 hours.

Do these disruptions in sleep patterns affect the crew's performance and health? In a study of carrier flight operations during the Vietnam War, Brictson and associates (*7*) found that the more fragmented the sleep/wake schedule, the worse the carrier landing performance. However, the total amount of sleep obtained over each 24-hour period was not significantly associated with landing performance.

REDUCING SLEEP

People often tell me that they could get more out of life if they didn't sleep so much, and ask, "Can I reduce my sleep?" The answer is *yes*—but it's not easy, and abrupt reductions in sleep time usually do not last. When the immediate need to reduce sleep passes, most people return to their former sleep schedule. However, when sleep is reduced gradually the change tends to persist.

When the Naval Health Research Center collaborated with the Psychiatry Department of the University of California, Irvine, on a sleep reduction study, we observed gradual sleep reduction in three couples who customarily slept 8 hours, and in one couple who slept 6½ hours a night. Each subject was asked to reduce his or her sleep by 30 minutes every three or four weeks, with the final amount of sleep reduction left for the subjects to determine based on their feelings and awake performance. Sleep was monitored by logs each subject kept and by recordings of EEG activity.

Among the 8-hour sleepers, two subjects reduced their sleep to 4½ hours, two to 5 hours, and two to 5½ hours. The two 6½-hour subjects stopped reducing their sleep time at 5 hours. All subjects said that fatigue and difficulty in getting up were their main reasons for stopping, even when awake performance was not seriously impaired. At the end of a follow-up year, all subjects were sleeping at least one hour less than

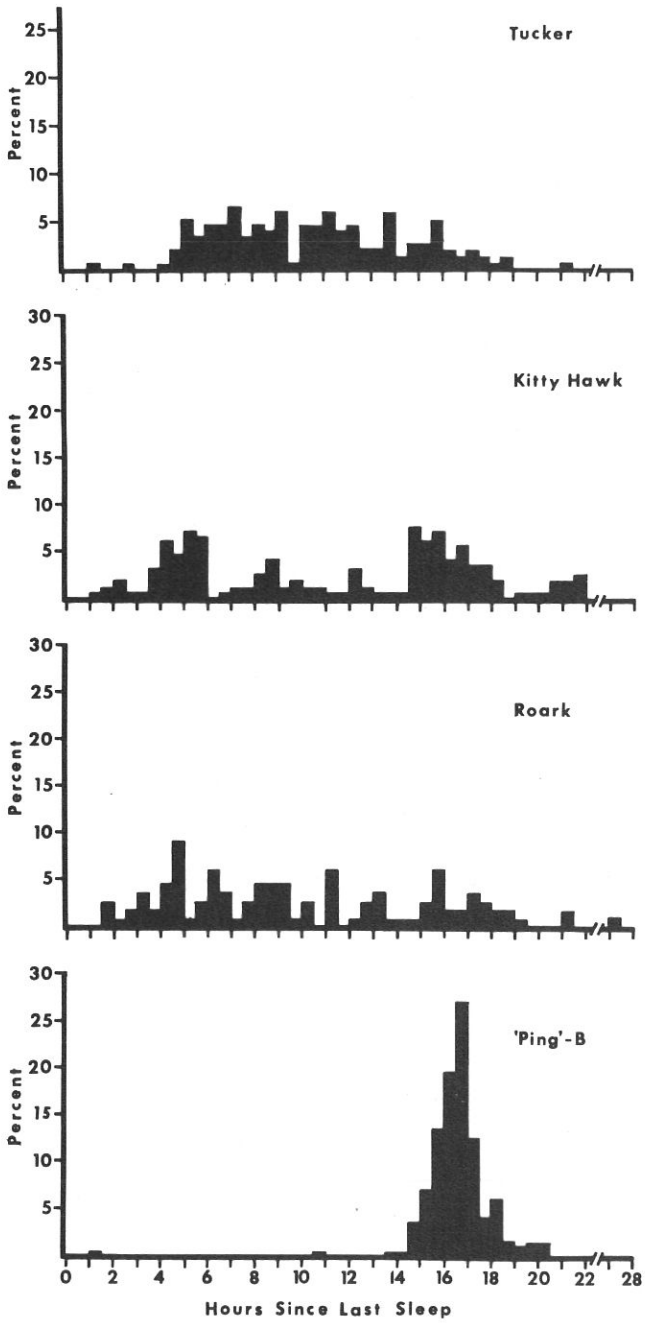

FIGURE 5. Profiles of shipboard and 'Ping' B sleep/wake cycles reflect fragmentation of shipboard sleep.

before the study and two subjects were sleeping two hours less. Mood and feelings of fatigue had returned to pre-study levels, even though sleep was reduced. The 6½-hour couple returned to their customary routine during follow-up, indicating that 6½ hours was their minimal sleep time.

These results suggest that some of us can function well on less sleep. But would it be worth the effort? For a lasting change, our sleep/wake cycle requires a gradual shift that allows our biological rhythms to adjust gradually. As noted earlier, if people feel fatigued and have trouble getting up, if they find themselves falling asleep easily during the day, and if it is hard for them to stay awake in the evening, they probably need more sleep. Further sleep reduction would not be wise.

SLEEP DEPRIVATION

How long can we go with no sleep at all? This question faces many commanding officers and people in charge of special military operations who must plan the logistics of sleep as carefully as they plan for food, ammunition, and other essentials (*8*).

Marshall (*9*) described the effects of sleep deficit and fatigue on paratroopers in the 1944 invasion of Normandy:

> They were dull-eyed, bodily worn and too tired to think connectedly. Even a 30-minute flop on the turf with the stars for a blanket would have doubled the power of this body and quickened the minds of its leaders to ideas which they had blanked out. But no one thought to take that precaution. The United States Army is indifferent toward common-sense rules by which the energy of men may be conserved in combat. . . . Said Captain Patch of his people on the far right, "They were so beat that they could not understand words even if an order was clearly expressed. I was too tired to talk straight. Nothing I heard made a firm impression on me. I spoke jerkily in phrases because I could not remember the thoughts which had preceded what I said."

The operational consequences for air crews of sleep deprivation and deficit have been discussed by Johnson and Naitoh (*10*); Woodward and Nelson of the Office of Naval Research have reviewed the literature on effects of sleep loss and work-rest schedules on performance (*11*). These two reports conclude that total sleep loss of more than 60 hours produces neurological, physiological, biochemical, performance, behavioral, and mood changes. While the degree of change depends on the individual, changes become evident in all areas as sleep loss goes beyond 60 hours.

One subject in our laboratory endured a sleep loss of 264 hours, and recovered completely after three nights of sleep (*12*). In most operational schedules, crewmembers would probably lose no more than 40 to 48 hours of sleep, with a 30 to 36 hour loss more likely. Such amounts can be tolerated without debilitating physiological changes.

Effects of sleep loss show first in mood changes and greater fatigue. Performance changes are minimal if tasks are brief, self-paced and highly motivating, and if the worker is given some idea of the adequacy of his

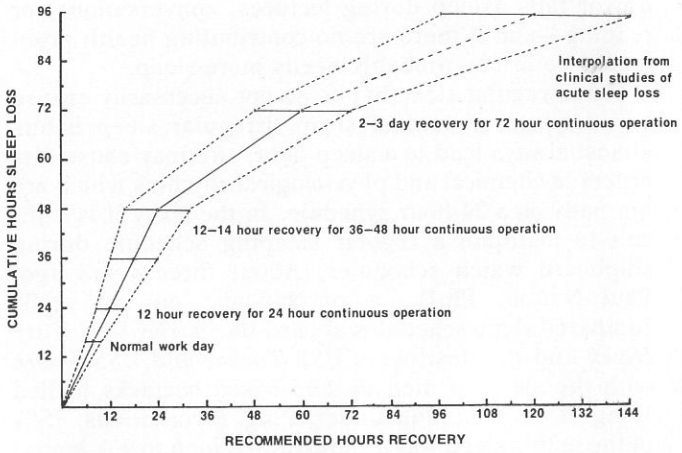

FIGURE 6. As hours of sleep loss increase, so do hours of recovery sleep needed. The dotted lines indicate that the variability of this ratio (hours of sleep/hours of recovery sleep required) also increases as the subject loses more sleep. (From Woodward and Nelson, 11)

performance. People performing tasks that require sustained vigilance and attention, use of newly acquired skills, retention of new information, and a long time to complete are more likely to show sleep-loss effects. Most of the decrement in performance will occur during brief periods of "microsleep" which occur as the person is working. These effects are more likely to occur in the early morning, when body temperature is low.

To minimize such effects, work should be reduced during hours when sleep would normally occur, regardless of the actual time of day. For example, travel in jets often results in duty schedules falling at times when one would normally be asleep. This "jet lag" effect and its relation to sleep loss must be taken into account in setting duty schedules.

After 36 hours of continuous duty, how much recovery sleep is required? Based on current research and operational data, Woodward and Nelson (*11*) have provided a useful guide for estimating recovery sleep times (Figure 6). For example if a man's duty results in 36 cumulative hours of sleep loss, he could find the recommended hours of recovery by noting the point on the guide where 36 hours of sleep loss (see vertical axis) intersects the solid line. Then, he would draw a vertical line from that point to the horizontal "hours of recovery" scale. For 36 hours of sleep loss, 18 hours of recovery are recommended. For 72 hours of sleep loss, 60 recovery hours are recommended. After 36 or 72 hours of sleep loss, it is highly unlikely that anyone would spend all of the recovery time in continuous sleep. The young man who was awake for 264 hours in our laboratory slept only 15 hours before awakening.

The Naval Health Research Center's psychophysiology laboratory is conducting a study of poor sleepers. We also plan to continue studying variations in sleep

schedules, with particular attention to determining the optimal wake-sleep schedule for effective performance after varying periods of sleep loss. Our results so far suggest that required sleep lengths and sleep schedules are flexible and can be adapted to a changed lifestyle. But the fact that none of our subjects' sleep time dropped below 4½ hours suggests there is a limit beyond which sleep cannot be reduced. The limit for fragmentation of sleep is still unknown.

Samuel Johnson, notes Webb (*6*), likened sleep to a gentle tyrant. To live on the best terms with a "gentle tyrant" one must learn the rules by which he governs. Being gentle, he permits us certain freedoms to manifest our individual variations and differences; being a tyrant, he will not permit us to live in total freedom, and abuses carry their ultimate consequences.

We hope our studies will shed some light on the rules acceptable to this "gentle tyrant."

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DON'T MISS

Preventive Medicine in Vietnamese Refugee Camps on Guam

In each experience such as the 1975 evacuation of Vietnamese refugees to Guam, we relearn the same lesson: relief operations following civil or political disasters primarily involve providing for human life support needs. Those needs include clean food and water, shelter, and sanitary waste disposal.

From April to October 1975, more than 120,000 Vietnamese refugees were sheltered in camps on Guam, presenting a major preventive medicine challenge to military medical teams. In *Military Medicine* [142(1): 19-28, Jan 1977], LCDR Robert Shaw, Jr. (MC), a member of the team sent from Environmental and Preventive Medicine Unit No. 6, describes techniques used to prevent and control disease in the camps.

Preventive medicine problems included locating a supply of potable water, disposing of waste, and keeping food safe to eat. Eliminating insects and rodents and controlling communicable diseases were other serious medical concerns. Lack of rapid communications and cultural differences between Vietnamese and Americans were practical problems.

Common complaints among refugees included upper respiratory infections, conjunctivitis, skin rashes, and gastroenteritis. Many refugees complained of mild fevers, headaches, sunburn, and ear infections, as well as minor injuries and fatigue. Malaria, an illness common in Vietnam, was diagnosed in about 70 refugees, but was ultimately confirmed in fewer than 5% of these 70 patients; vector control measures prevented transmission of malaria in the camps. Six patients had dengue fever; ten refugees suffered from typhoid, and two from diphtheria. About 20 patients with active tuberculosis were discovered.

Preventive medicine teams controlled the spread of vector-borne diseases by spraying garbage cans and other potential insect breeding sites with pesticides. Drainage pits filled with crushed rock and coral were effective in eliminating standing water around field kitchens, showers, and washing areas.

Medical personnel conducted mass immunizations against diphtheria, pertussis, measles, German measles and polio. A network of Army field dispensaries scattered through the camps, and several tent dispensaries manned by Vietnamese medical and paramedical personnel, helped Navy medical teams provide efficient service.

Dr. Shaw suggests that in planning for future emergency evacuations of civilians, military medical personnel should consider communications, transportation, identification of all available medical personnel, cultural differences, and recreation for evacuees. Military medical teams used in civilian emergencies should include pediatricians and public health nurses, he adds.

Managing Emergencies in the Dental Office

CAPT Edward L. Mosby, DC, USN

Although most dental emergencies can be prevented by conscientious management of patients, there are times when emergencies arise even after great pains have been taken to avoid them. Because of these rare instances, the dentist and his staff must know how to treat, and be equipped and ready to treat, acute conditions. A well-prepared dental team can manage most emergencies competently and safely without the aid of a physician.

The best way to handle any dental emergency is to prevent it. Among the methods employed to anticipate, intercept or prevent dental office emergencies are:

- taking a thorough social and medical history of the patient.
- establishing good rapport with the patient.
- positioning the patient correctly in the dental chair.
- monitoring vital signs.
- giving the patient preoperative medication.
- keeping emergency equipment and drugs nearby.

Patient history. A minimal patient history should include answers to these questions:

1. Are you presently under the care of a physician?
2. If so, what are you being treated for?
3. Do you have any allergies or sensitivities?
4. Have you been ill recently?
5. Have you ever had side effects from injections of Xylocaine or Novocain?
6. Has a dentist ever had trouble extracting one of your teeth?
7. Have you ever had prolonged bleeding from cuts, surgery or a tooth extraction?
8. Do you, or does anyone in your family, have diabetes?
9. Have you ever suffered from any of the following conditions:
   - kidney or urinary problems?
   - liver trouble, hepatitis or jaundice?
   - growth or tumor?
   - high blood pressure?
   - tuberculosis?
   - sinus trouble?
   - heart disease, heart murmur, or rheumatic fever?
   - convulsions or dizzy spells?
10. Have you recently lost or gained a lot of weight?
11. Are you now receiving any medication?
12. Are you receiving radiation therapy?
13. What problem led you to seek dental treatment?

This history should be signed and dated by the patient and dentist. It should be a permanent part of the patient's record, and updated at least every six months.

Good rapport. Every member of the dental treatment team should establish good rapport with the patient. The patient should be made to feel that he or she is the single most important patient in the dentist's practice. Office surroundings contribute to this goal when they are kept simple and pleasant.

Proper position. Some dentists still work with the patient in a sitting position. I recommend that all procedures, including oral surgery, be done with the patient in a reclining position, which prevents vasodepressor syncope (fainting) by increasing cerebral blood flow (*1*). The dentist and assistant should be seated to avoid fatigue and stress.

Vital signs. A recently published article (*American Dental Association News*, 31 May 1976, p 4) emphasized that "anyone who takes up a Novocain syringe has an obligation to take blood pressure." Recording each patient's blood pressure requires only a few moments of a trained assistant's time, and has many potential advantages (*1,2*):

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• dental workers may discover unknown cardiovascular disease in the patient.
• blood pressure readings may be needed as preoperative data if an emergency occurs.
• blood pressure readings can help the dentist decide whether an emergency is serious enough to require a physician's advice.
• office personnel can stay familiar with the procedure and will not panic when they must take blood pressure in an emergency.

Recording temperature before a dental surgical procedure may also be beneficial. Some oral surgeons believe that patients with elevated temperatures tend to have more postoperative complications. Obviously the more sophisticated or complicated anesthetic procedures (sedation or general anesthesia) require monitoring additional vital signs such as pulse and respirations, and may warrant an ECG.

Sedation. Sedating the patient may prevent some emergencies during dental treatment. Also many patients can benefit from preoperative sedation; such patients include those with anxiety, hypertension, or a coronary disease such as angina or coronary occlusion, as well as patients who will undergo a lengthy dental procedure (*3,4*). Preoperative sedation can be given effectively as oral medication.

Drugs and equipment. There are several requirements for equipping an emergency set-up: keep it simple, keep it accessible, keep it mobile, and make sure you always remember the contents.

An emergency drug cart should be only large enough to store equipment and supplies necessary to manage emergency situations. It should be mobile and complete—that is, contain its own source of suction and supply of oxygen. The style can range from a cart designed specifically for emergency use to a practical alternative, such as a mobile, three-drawer tool chest. Only a few drugs should be stored, and these should be readily available and organized so that office personnel will not be confused about where to find them in an emergency.

EMERGENCY CARDS

For each emergency situation, common signs and symptoms should be listed on one side of a 3'' x 5'' card; on the other side are the plan of treatment and a list of drugs to be used in an emergency. If possible, the card and drugs for each emergency should be placed in a labeled, zip-lock bag and stored in a drawer of the emergency drug cart. The drawer should be labeled to indicate which emergency bag it contains.

Here are examples of card descriptions for several emergency conditions; signs, symptoms and treatments are summarized from McCarthy (*1*). An asterisk (*) indicates that the treatment may be beyond the dentist's ability and should be performed by a person qualified to continue treatment from that point.

Syncope

Signs and Symptoms (Side 1)
1. Frightened patient
2. Cool, moist, clammy skin
3. Pale appearance

NOTE: Convulsions may occur.

Treatment (Side 2)
1. Place patient with head down
2. Make certain patient has patent airway
3. Administer aromatic spirits of ammonia
4. Apply cold towel to forehead
5. Give oxygen

Seizures

Signs and Symptoms (Side 1)
(Seizure is a sign or symptom of a disease, not a disease in itself)
1. Involuntary or bizarre movements
2. Tongue biting
3. Mental confusion
4. Loss of consciousness

NOTE: Tetanus, complete or incomplete, may be present (uncommon).

Treatment (Side 2)
1. Insert oropharyngeal airway and give oxygen
2. Place patient in semi-prone position
3. Aspirate secretions as necessary
4. Protect patient from injury:
   Cushion head
   Place gauze-wrapped tongue depressor in mouth
5. Establish I.V. route (5% dextrose in water, normal saline, other solutions as necessary)
6. Give Valium 5-10 mg I.M. or I.V. over 3 minutes*

Hyperventilation

Signs and Symptoms (Side 1)
1. Rapid short breaths (causing decrease of CO_2)
2. Unconsciousness

Treatment (Side 2)
1. Reassure patient
2. Place patient in comfortable position
3. Have patient inhale and exhale through mouth while holding paper bag over mouth
4. Give Valium 5-10 mg I.M. or I.V. over 3 minutes*

Circulatory Depression

Signs and Symptoms (Side 1)
1. Palor
2. Rapid, weak pulse
3. Low blood pressure

Treatment (Side 2)
1. Place patient in supine position

2. Make certain airway is open
3. Administer oxygen
4. Establish I.V. route (5% dextrose in water, normal saline, other solutions as necessary)
5. Support circulation
   Hypotension—Ephedrine 12.5 mg I.V.* or Wyamine 15-30 mg I.V.*
   Bradycardia—atropine 0.4-0.6 mg I.V.*

Angina and Myocardial Infarction

Signs and Symptoms (Side 1)
1. Chest pain—may be radiating

Treatment (Side 2)
1. Place patient in supine position
2. Assure patent airway
3. Nitroglycerine 0.3 mg sublingual
4. Amyl Nitrite aspirols under nose (for severe pain)
5. Give oxygen
6. If no relief, consider myocardial infarction and administer Demerol 25-75 mg I.M. or I.V.*

Cardiac Arrest

Signs and Symptoms (Side 1)
1. Cessation of effective cardiac output:
   No pulse
   No blood pressure
   Coma
   Cyanosis

Treatment (Side 2)
1. Provide basic cardiopulmonary resuscitation
   Ventilation—12 per minute
   Cardiac compressions—60-80 per minute
2. Advanced cardiopulmonary resuscitation*
   Intubate
   Institute adequate I.V. (5% dextrose in water, normal saline, other solutions as necessary):
   1. Sodium bicarbonate (NaHCO)—one ampule (44.6 mEq) immediately and one ampule every 5 minutes of arrest
   2. Calcium chloride—One gm (1000 mg) in 10 cc
   3. Lidocaine HCl—100 mg I.V.
3. *Do not* interrupt basic cardiopulmonary resuscitation for more than 5 seconds, for any reason

Asthma

Signs and Symptoms (Side 1)
1. Wheezing-type dyspnea
2. Effortless inspiration, prolonged expiration
3. Distended chest
4. Severe cyanosis

Treatment (Side 2)
1. Place patient in sitting position
2. Assure patent airway
3. Administer oxygen
4. Two inhalations of isoproterenol HCl
5. Epinephrine (1:1000) 0.3-0.5 ml subcutaneously (for severe asthma)*
6. Hydration (oral or I.V.)

Diabetes

Signs and Symptoms (Side 1)
1. Excessive thirst
2. Frequent urination
3. Acetone breath odor
4. Nausea
5. Collapse or coma

Treatment (Side 2)
1. Give sugar (candy, fruit juice, or sugar cube)
2. If sugar fails, consider ketoacidosis and prepare to transport patient to medical facility
3. Support cardiopulmonary system

Central Nervous System Stimulation

Signs and Symptoms (Side 1)
1. Excitement and tremors

Treatment (Side 2)
1. Place patient in supine position
2. Assure patent airway
3. Give oxygen
4. Reassure patient
5. If convulsions begin, give Valium 5-10 mg I.M. or I.V. over 3 minutes*

Allergic Reaction

(for sample emergency kit, see Figure 1)

Signs and Symptoms (Side 1)
1. Mild:
   Urticaria, pruritus, skin eruptions, mild angioneurotic edema
2. Severe:
   Involvement of bronchial tree (congestion)
   Respiratory depression
   Edema

Treatment (Side 2)
1. Place patient in supine position
2. Assure adequate airway
3. Give oxygen
4. Support respiration and circulation
5. For mild reaction—50 mg diphenhydramine HCl (Benadryl) orally
6. For severe reaction—obtain an I.V. route—50 mg diphenhydramine HCl (Benadryl) I.V.*

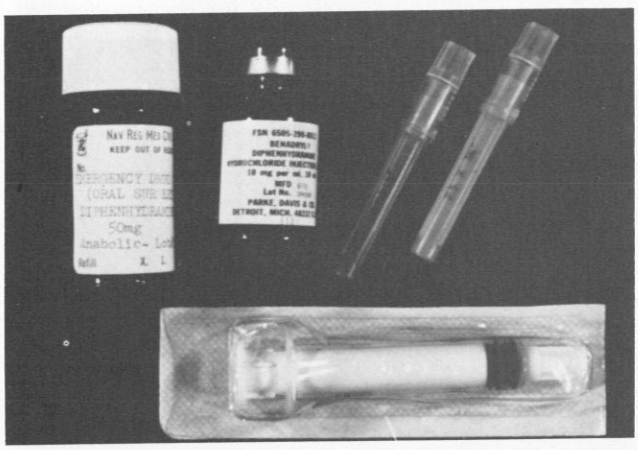

FIGURE 1. Emergency kit for treating allergic reactions includes (clockwise from top left) diphenhydramine HCl tablets, diphenhydramine HCl in liquid form for an injection, two different size needles, and syringe.

Anaphylactic Shock

Signs and Symptoms (Side 1)

1. Shock, or varying degrees of hypotension
2. Pulmonary edema, cardiac arrest, or both
3. Laryngeal obstruction, bronchospasm, or both
4. Angioedema, urticaria, and generalized pruritus
5. Urgency or incontinence of urine or feces
6. Nausea, vomiting, diarrhea, gastrointestinal hemorrhage, colic

NOTE: Convulsions may occur.

Treatment (Side 2)

1. Place patient supine on hard surface
2. Cardiopulmonary resuscitation
3. Start I.V. (5% dextrose in water, normal saline, other solutions as needed)
4. Epinephrine 1:1000*
   Subcutaneous—0.3-0.5 ml in 10 cc over 5 minutes*
5. Treat hypotension and shock
6. Treat bronchospasm*
   Aminophylline—250 mg I.V. (slowly)*
   Hydrocortisone—100 mg I.V. (slowly)*

DISCUSSION

Certain steps are essential in treating a dental emergency: assure a patent airway, support respiration, support circulation, aspirate secretions as needed—and call for help from a nearby physician or rescue squad, whose phone numbers should be posted at every office telephone.

While the treatments listed above that are marked with an asterisk may or may not be rendered by the dentist, the drugs used in these procedures should be available in the dental office. Items not listed that may be included on an emergency drug cart include assorted sizes of oxygen masks, a means of delivering positive pressure oxygen, and equipment for endotracheal intubation. Narcotics should not be kept in the cart because they are often stolen.

I also suggest that all dentists become certified instructors in cardiopulmonary resuscitation so they can teach their office personnel the basic techniques.

Successful management of an emergency depends on having adequate equipment and supplies, and knowing how to use them rapidly and logically. (Along the same lines, dentists must also know the components, safe dosages and capabilities of drugs they administer routinely, such as Xylocaine.) Every dental office should conduct emergency drills at least once a month to ensure that emergency equipment and supplies are accessible and work properly. At this time, inventory can be taken and outdated supplies replenished.

Dentists can protect themselves from lawsuits by preparing well for emergencies. According to McCarthy (*1*), dentists can be legally liable for damages if they make a wrong diagnosis of an emergency condition "caused" by dental care or treatment. Furthermore, dentists who do not have adequate training and equipment to give definitive treatment for emergencies can be liable for the consequences.

Dentists who administer local anesthetics or other potentially anaphylactic agents may soon be required by law to know how to establish a clear airway, deliver oxygen (artificial ventilation), administer fluids and medications by parenteral and intravenous routes, and perform cardiopulmonary resuscitation. If such laws are passed, the dentist who learns these techniques to prepare for emergencies will be one step ahead.

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DON'T MISS

Simple Technique for Collecting Live Ticks

Navy entomologists have successfully tested a simple, rapid technique for collecting large samples of live ticks.

Using a method first proposed in 1965, LCDR R.H. Grothaus (MSC), J.R. Haskins, and J.T. Reed placed a block of dry ice in an aluminum pie pan and centered the pan on a nylon panel on the ground. The melting ice gave off carbon dioxide, which attracted ticks, while the pan prevented the ticks from coming into direct contact with the ice. After an hour, any ticks that had moved onto the nylon were counted, and shaken or brushed from the nylon into another pan. This procedure made it possible to collect large numbers of undamaged ticks rapidly, with minimal handling. The researchers were able to establish 80 sample sites in about 5 hours, including recovery and storage or release of the ticks.

"A Simplified Carbon Dioxide Collection Technique for the Recovery of Live Ticks (Acarina)" was published in the *Journal of Medical Entomology* [12(6):702, 1976]. Copies are available from the Office of Technical Information and Professional Publications, Bureau of Medicine and Surgery (Code 0010), Navy Department, Washington, D.C. 20372.

Missed Fracture Dislocation of the Elbow with Translocation of the Radius

CDR Alvin H. Crawford, MC, USNR
CDR Earl F. Evans, MC, USN

In a review of 183 reports of dislocation of the elbow in the orthopedic literature, we failed to find a description of an irreducible fracture dislocation of the elbow with translocation of the radius. After such a dislocation, the radius articulates with the trochlea and the ulna with the capitellum. This report is a description of such an injury.

PATIENT REPORT

M.W. is a 12-year-old female who came to the Orthopedic Service of Naval Regional Medical Center San Diego, Calif., on 9 Sept 1971. She had been seen several hours before at an outlying facility. A review of her history revealed that earlier that day she had fallen on her left arm while trying to leapfrog over a tractor tire. The patient was unable to recall the exact mechanism of her injury. Roentgenograms accompanying the patient were interpreted as showing a posterior dislocation of the elbow (Figures 1 and 2). A closed reduction and splinting were performed. Post-reduction roentgenograms (Figures 3 and 4) were believed to show adequate reduction and the patient was allowed to return home, with instructions to use ice packs and elevate the injury.

The following morning, on her return for a cast check, the patient complained of marked pain about the elbow. She felt pain when she extended her fingers passively, and also when she flexed them actively. Her distal capillary filling, sensation, and motor function were judged normal. The immobilizing splint was changed to relieve pressure and the patient was admitted to the hospital for two days for observation, elevation, and ice pack treatments.

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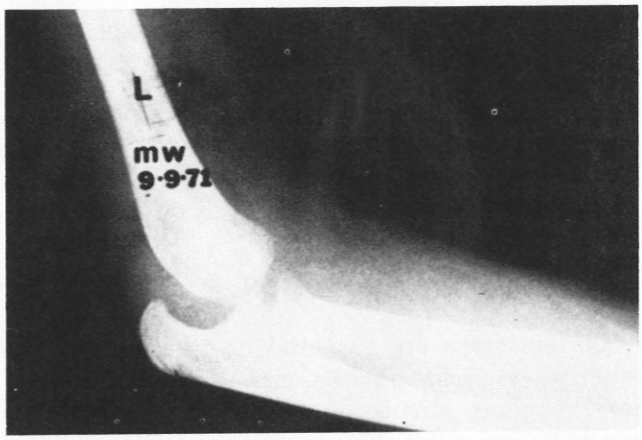


FIGURE 1. Original lateral view of posterior dislocation of the left elbow.

During that period she regained painless active and passive motion of her fingers. She was discharged to outpatient care, and her arm was immobilized for two weeks in a posterior splint. After two weeks she started to perform range-of-motion exercises for her elbow and forearm.

In the following six weeks she made very slow progress, gaining only 35 degrees of motion (60 to 95 degrees in flexion, 50 degrees in supination, and 0 degrees in pronation). In a second review of her roentgenograms, Dr. Crawford found that although on lateral roentgenograms the radial head pointed directly to the capitellum, anterior-posterior views of the injury showed the radius to be on the trochlear side of the humerus, and the ulnar coronoid process articulating on the capitellum. Further evaluation revealed that there was, in fact, a medial dislocation of the proximal radius, with a fracture fragment of the radial head remaining in the radial notch (compare Figures 5 and 6 with Figures 7 and 8).

Open reduction was performed in November 1971. There was found to be a fibrous ankylosis of the radius, which was in a dislocated position on the medial side of the ulnar coronoid process. The fragment which had fractured off the radial head was

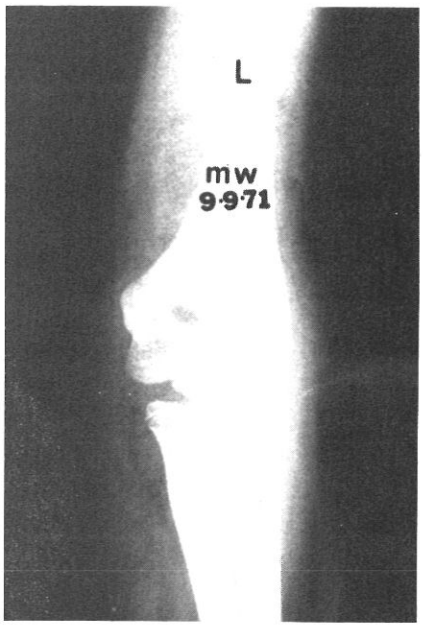


FIGURE 2. Original anterior-posterior view of posterior dislocation of the left elbow.

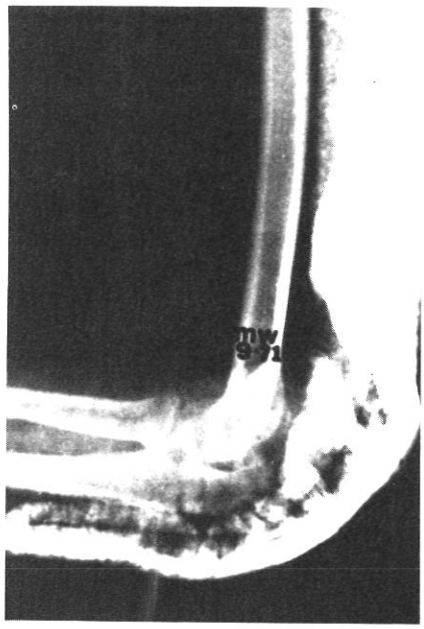


FIGURE 3. Post-reduction roentgenogram shows dislocation of left elbow with posterior splint applied. Note that capitellum appears to articulate with radial head.

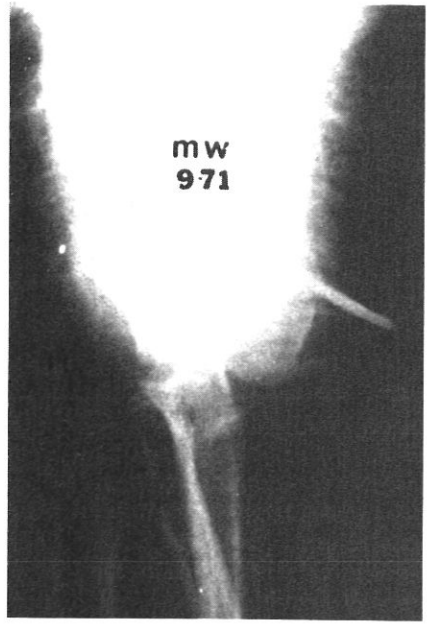


FIGURE 4. Anterior-posterior view shows reduction of left elbow dislocation. Ulna appears to articulate with ulnar groove, but radius articulates with trochlea.

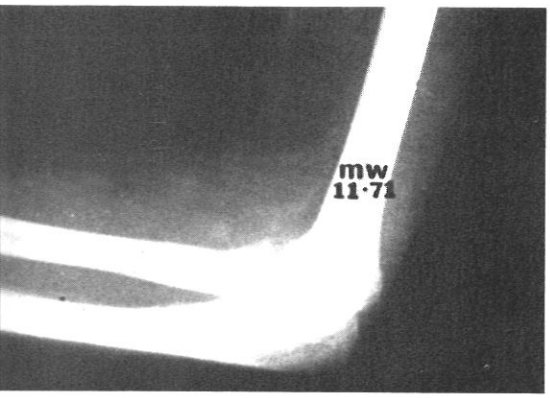


FIGURE 5. Lateral view of left elbow two months after reduction. Radial head appears to articulate with capitellum.

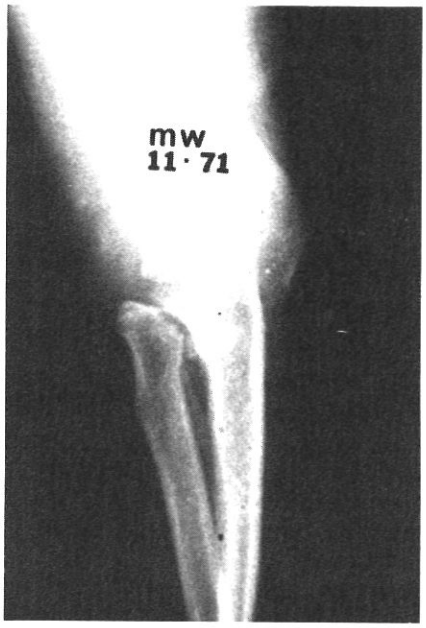


FIGURE 6. Anterior-posterior view of left elbow two months after reduction. Radial head appears to articulate with trochlea and ulna appears to articulate with capitellum.

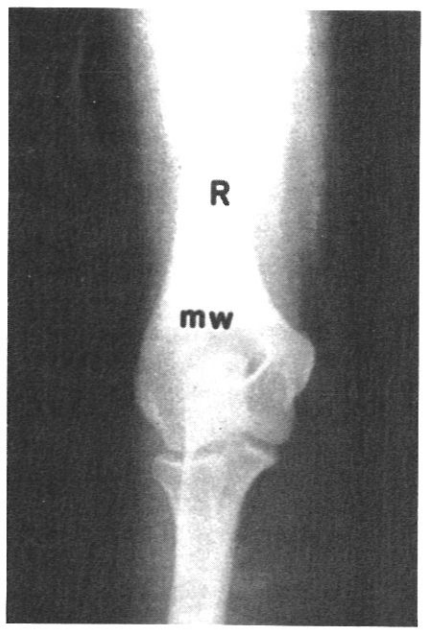


FIGURE 7. Anterior-posterior view of normal right elbow, in which radial head articulates with capitellum.

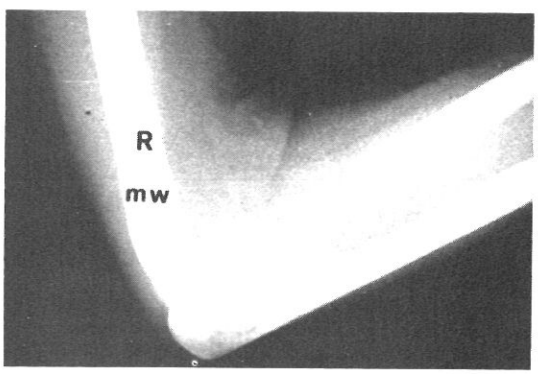


FIGURE 8. True lateral view of normal right elbow. Radial head articulates with capitellum, and there is no increase in joint space between humeral condyles and ulna.

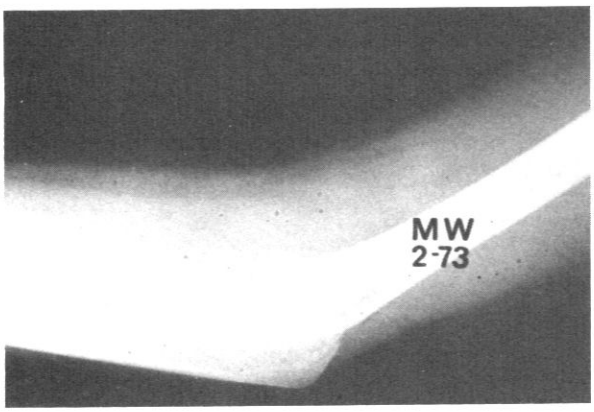
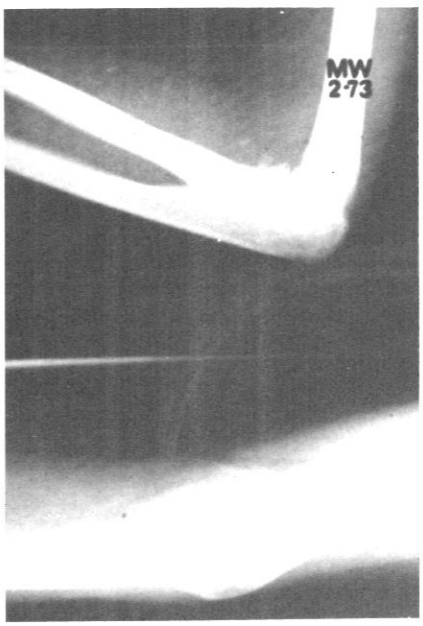


FIGURE 9. View of left elbow with arm extended. Note loss of joint space. Extension is limited approximately 45 degrees.



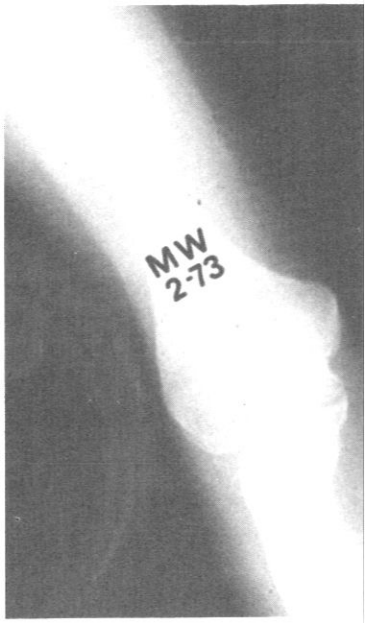


FIGURE 10 (left). Anterior-posterior and lateral views of left elbow five months after injury occurred. In both views, joint space is markedly diminished and radial head appears to articulate with capitellum.
FIGURE 11 (above right). Anterior-posterior view of left elbow five months after injury occurred. Note that ulna articulates in trochlear groove, and part of radial head appears to be absent. There appears to be a synostosis of the proximal radius and ulna.

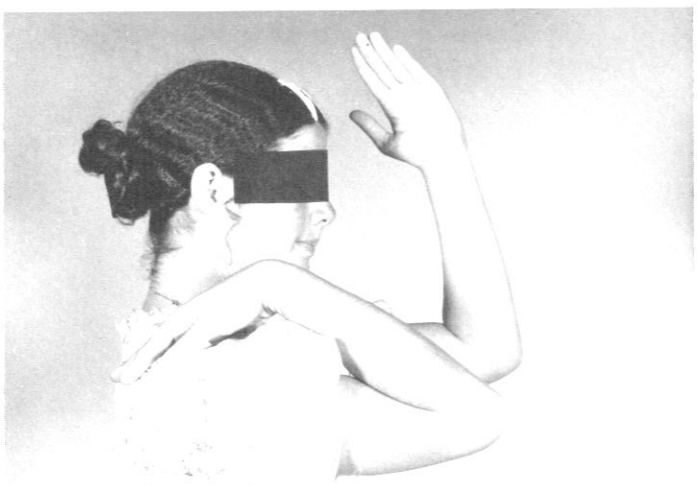


FIGURE 12. Clinical photograph of patient one year after injury. Note full flexion of right elbow and 100-degree flexion of left elbow.

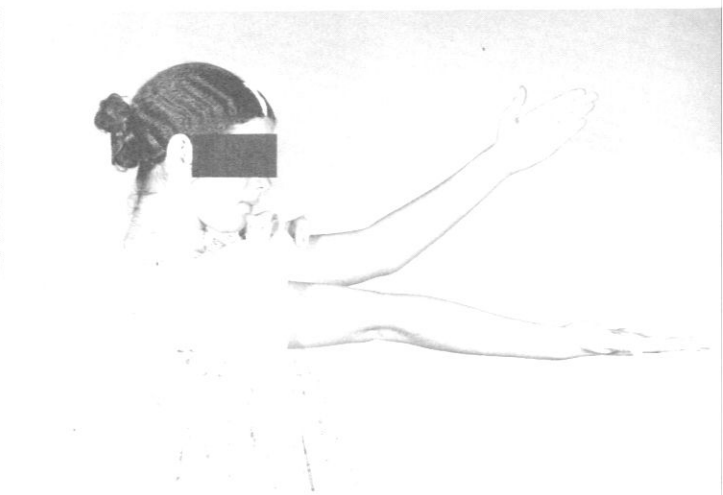


FIGURE 13. Clinical photo of patient one year after injury. Note full extension of right elbow and 45-degree limitation of left elbow extension.

found in the radial notch of the ulna, representing approximately 35% of the epiphysis of the radial head. There were no loose bodies in the elbow joint. Following blunt dissection along the proximal half of the radius, reduction was accomplished, but was very unstable due to loss of the posterior medial half of the radial head and its retaining ligaments. Pin fixation of the radius to the ulna, with the forearm in neutral rotation, was required to maintain the reduction after removal of the radial head fragment.

Following reduction, range of motion was from 175 degrees of extension to 35 degrees of flexion. After an uncomplicated postoperative course, active range of motion with protective splinting was started on the 12th postoperative day. The pin was removed in the fifth postoperative week, followed by successive casting to regain extension. Progressive bony synostosis occurred between the proximal ends of the radius and ulna.

On reevaluation 18 months after the injury and 16½ months after open reduction, the patient had no pain in her elbow and had few complaints about her loss of motion. On examination we found a 30-degree flexion contracture with further flexion to 80 degrees. There was complete synostosis with the forearm in neutral position, but she had only partial (15 to 20 degrees) pronation and supination at the wrist. There was no varus or valgus deformity at the elbow (Figures 9, 10, and 11). Clinical photographs showed a range of motion similar to that of her normal right arm (Figures 12 and 13).

DISCUSSION

Although we found it difficult to reconstruct this injury because the patient could not recall exactly how she had fallen, we believe that her elbow underwent stresses which usually would have caused a posterolateral dislocation of the elbow. Because her distal limb was pinned down, the ulna shifted to a posterolateral position, as is common, but the radial head fractured at its posterior medial aspect and dislocated across the coronoid process to the ulnar side.

Some basic procedures in managing fracture dislocations could have been of tremendous benefit to this patient. For example, following reduction, the joint could have been placed through its full range of motion, which at the elbow includes pronation and supination as well as flexion and extension. Then the injury might have been recognized earlier, although flexion, extension, pronation and supination were 50% of normal capability. Of course, comparison views of the opposite elbow would have been invaluable; however, comparison views are not always ordered for patients as old as this girl.

One rule that is usually considered important was not completely reliable in this instance. That rule is: following reduction of an elbow dislocation the radial head should always point directly to the capitellum in all views. But in this patient, the radial head pointed to the capitellum on the lateral view only (Figures 3 and 5).

At the time of surgery, transfixation with pins was necessary to maintain the radius in its reduced position after the proximal fragment that had been embedded in the radial notch was excised. There was no trace of the orbicular ligament. Excision of the radial head might have given her better flexion and extension, but probably would not have improved pronation or supination due to the amount of soft tissue stripping required to gain reduction.

The patient is now clinically well and has no desire to undergo further surgery. We believe her experience is unusual and instructive.

DON'T MISS

Nongonococcal Urethritis: A Growing Problem in the Navy

Nongonococcal urethritis is a much greater problem, and is more closely associated with gonorrhea, than has generally been recognized, says a Navy epidemiologist.

Writing in the *American Journal of Epidemiology* [104(5):535-542, 1976], CDR Lee J. Melton III (MC) describes his study of the relative frequency of gonorrhea and nongonococcal urethritis among all active-duty Navy and Marine Corps personnel between 1966 and 1974. Results showed that the annual incidence of nongonococcal urethritis in the Navy is substantial, equaling or exceeding the incidence of gonorrhea in most areas studied. Also, the incidence of nongonococcal urethritis and the incidence of gonorrhea are rising at the same rate.

If civilian data confirm the close relationship between nongonococcal urethritis and gonorrhea, clinicians will not be able to assume that all urethritis is caused by *Neisseria gonorrhoeae* and that penicillin is the treatment of choice. They will have to give more thought to the source and spread of the patient's infection, says the author.

"Comparative Incidence of Gonorrhea and Nongonococcal Urethritis in the United States Navy" is available from CDR Melton at the Bureau of Medicine and Surgery (Code 5511), Navy Department, Washington, D.C. 20372.

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